

Danish farmer cooperatives: Development, importance and lessons

Cooperativas de agricultores danesas: desarrollo, importancia y lecciones

Cooperativas de agricultores dinamarquesas: Desenvolvimento, importância e lições

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Abstract

The Danish farmer-owned cooperatives started back in the 1880s. The overall aim was to ensure farmers' market power and market access in the marketing chain. Since then, cooperatives have emerged in most major agricultural and food industries. In certain industries, the market shares of cooperatives are large and dominant (pig meat, dairy, fur, feedstuff, etc.). In other sectors, market shares are smaller, and in some sectors, cooperative ownership has completely ceased (sugar, poultry, etc.). There are several significant drivers behind and explanations why developments have been so different. Cooperative ownership is found only in the agricultural supply and processing sectors, while farms are mostly owned and managed by the individual farmers.

A number of prerequisites have been crucial for the significant development of the Danish farmer cooperative industry. A top-down approach has been important, so that farmers themselves have driven the development and have had strong incentives to strengthen the cooperative model. A certain level of social capital, a human cohesion, a certain level of education as well as a certain degree of trust and access to infrastructure have also been important factors.

Today, the development and importance of cooperatives is recognized as a key driver behind the strong international competitiveness of the agricultural and food sectors in Denmark. Based on the experience and drivers behind the Danish cooperative model and on experience and reflections from less developed countries, opportunities and barriers to transferring Danish cooperative experiences to other countries are analyzed and evaluated. The results in terms of market access, etc. meet the needs of farmers in many less developed countries. However, a number of barriers are identified, and the cooperative model must be adapted to the specific circumstances in individual countries.

Keywords: Cooperatives, Denmark, driver, development, experience

P26 Economía política • Derechos de propiedad

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Q12 Microanálisis de empresas agrícolas, hogares agrícolas y mercados de insumos agrícolas

Resumen

Las cooperativas de propiedad de agricultores daneses comenzaron en la década de 1880. El objetivo general era garantizar el poder de mercado de los agricultores y el acceso al mercado en la cadena de comercialización. Desde entonces, han surgido cooperativas en la mayoría de las principales industrias agrícolas y alimentarias. En determinadas industrias, las cuotas de mercado de las cooperativas son grandes y dominantes (carne de cerdo, lácteos, pieles, piensos, etc.). En otros sectores, las cuotas de mercado son menores y, en algunos sectores, la propiedad cooperativa ha cesado por completo (azúcar, aves de corral, etc.). Hay varios impulsores importantes detrás y explicaciones de por qué los desarrollos han sido tan diferentes. La propiedad cooperativa se encuentra solo en los sectores de procesamiento y suministro agrícola, mientras que las granjas son propiedad y están administradas principalmente por agricultores individuales.

Una serie de requisitos previos han sido cruciales para el desarrollo significativo de la industria cooperativa de agricultores danesa: Un enfoque de arriba hacia abajo ha sido importante, de modo que los propios agricultores hayan impulsado el desarrollo y hayan tenido fuertes incentivos para fortalecer el modelo cooperativo. Un cierto nivel de capital social, una cohesión humana, un cierto nivel de educación así como un cierto grado de confianza y acceso a la infraestructura también han sido factores importantes.

Hoy en día, el desarrollo y la importancia de las cooperativas se reconoce como un motor clave detrás de la fuerte competitividad internacional de los sectores agrícola y alimentario en Dinamarca. Sobre la base de la experiencia y los impulsores del modelo cooperativo danés y de la experiencia y las reflexiones de los países menos desarrollados, se analizan y evalúan las oportunidades y barreras para transferir las experiencias cooperativas danesas a otros países. Los resultados en términos de acceso al mercado, etc. satisfacen las necesidades de los agricultores en muchos países menos desarrollados. Sin embargo, se identifican una serie de barreras y el modelo cooperativo debe adaptarse a las circunstancias específicas de cada país.

Palabras clave: Cooperativas, Dinamarca, motor, desarrollo, experiencia.

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Resumo

As cooperativas de agricultores dinamarqueses começaram na década de 1880. O objetivo geral era garantir aos agricultores o poder de mercado e o acesso ao mercado na cadeia de comercialização. Desde então, surgiram cooperativas na maioria das grandes indústrias agrícolas e alimentares. Em certas indústrias, as quotas de mercado das cooperativas são grandes e dominantes (carne de porco, laticínios, peles, rações, etc.). Em outros setores, as participações de mercado são menores e, em alguns setores, a propriedade da cooperativa cessou completamente (açúcar, aves, etc.). Existem vários fatores importantes por trás e explicações de porque os desenvolvimentos têm sido tão diferentes. A propriedade cooperativa é encontrada apenas nos setores de abastecimento e processamento agrícola, enquanto as fazendas são em sua maioria de propriedade e administradas por agricultores individuais.

Uma série de pré-requisitos foram cruciais para o desenvolvimento significativo da indústria cooperativa de agricultores dinamarquesa: Uma abordagem de cima para baixo foi importante, de modo que os próprios agricultores impulsionaram o desenvolvimento e tiveram fortes incentivos para fortalecer o modelo cooperativo. Um certo nível de capital social, uma coesão humana, um certo nível de educação, bem como um certo grau de confiança e acesso à infraestrutura também foram fatores importantes.

Hoje, o desenvolvimento e a importância das cooperativas são reconhecidos como os principais impulsionadores da forte competitividade internacional dos setores agrícola e de alimentos na Dinamarca. Com base na experiência e motivadores por trás do modelo cooperativo dinamarquês e na experiência e reflexões de países menos desenvolvidos, oportunidades e barreiras para a transferência de experiências cooperativas dinamarquesas para outros países são analisadas e avaliadas. Os resultados em termos de acesso ao mercado, etc. atendem às necessidades dos agricultores em muitos países menos desenvolvidos. No entanto, várias barreiras são identificadas e o modelo cooperativo deve ser adaptado às circunstâncias específicas de cada país.

Palavras-chave: Cooperativas, Dinamarca, motorista, desenvolvimento, experiência

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Introduction

Farmer owned cooperatives represent essential parts of food value chains globally. Through cooperatives, farmers achieve a number of benefits, including lower transaction costs, better vertical integration, collective bargaining and secure market access. Farmer owned cooperatives seem to solve a number of market and economic barriers, which farmers otherwise face around the world.

However, the degree of cooperative organisation in agriculture and the food industry varies significantly from industry to industry and from country to country, which can partly be explained by the different market conditions, which to a greater or lesser degree stimulate cooperative organisation. In the case of cooperatives in

agriculture and the food industry, a pattern is apparent in that cooperatives are most widespread in North America, Northern and Central Europe, Japan and Korea.

Although cooperatives from a theoretical point of view seem to have strengths and advantages, an important question must be raised: Has the cooperative ownership in today's world any value at all, and is it appropriate to stimulate and support cooperatives in countries or areas with potential needs? With increasing globalisation and liberalisation, more trade and increasing competition the benefits of cooperatives may disappear or be reduced. Does it make any sense, and can farmers benefit from transfer of cooperative ownership internationally? Furthermore, would cooperative ownership not spread by itself if it were beneficial?

Among investors and economists, cooperatives often have a mixed reputation (Hansen, 2011; 2012a). Cooperatives are considered to be outdated, extinct and non-dynamic. The view is that because farmers dominate cooperative companies, they are not managed by the same modern business practices as investor-owned companies. Furthermore, cooperatives are closed as only farmers can become owners and members, while external investors have no access to cooperatives.

However, some of these considerations are based on prejudice and lack of knowledge. Cooperative members often have a very open debate about the companies' situation, and active ownership is perhaps most common among cooperative companies. The owners (members) are often highly motivated to ensure that the cooperative is highly competitive, as the performance has a significant influence on their individual earnings. In addition, the day-to-day management of cooperatives is carried out by businessmen, who run the business with well-defined earnings targets in the same way as in other capital-owned companies. If this were not the case, they would not be competitive on international markets.

Agri food cooperatives are often established, when local farmers want to solve a market access problem. Nowadays, cooperatives have become increasingly larger, fewer and more international, and thus the distance from farmer to management and customers has become far greater. Farmers' democratic influence may also appear to be an illusion. However, in reality, farmers today are very dependent on their cooperative, perhaps more than previously.

With very large farms and large agricultural production, farmers are extremely financially dependent on the performance of their cooperatives. It is important for the financial situation of the farms that the profit from up- and downstream activities is transferred back them. Based on this, it may be interesting to study the Danish farmer owned cooperatives. Denmark has a very long tradition of farmer owned cooperatives, and they play a relatively large and important role in the agricultural and food industry.

A study of the long-term development of the farmer owned cooperative industry in Denmark can identify some of the basic drivers, impacts and conditions that have shaped the development. Thus, explanations of the development can be found, and the different performances among the cooperatives in the agri food industry can be shown and explained.

The present and short-term development may shed light on some of the latest trends and challenges in the cooperative industry that the current market situation is creating. Structural developments in agriculture, globalisation, technological development, economies of scale and increasing international competition create new conditions for the cooperative industry, which requires new initiatives. Based on the results of this analysis, it will be valuable to clarify whether, and if so how, Danish experiences can be transferred to other countries.

This article first discusses how strengths, weaknesses, performance as well as benefits and disadvantages of cooperatives can be assessed. Next, general advantages and disadvantages of the cooperative model are identified and described. The main drivers behind the establishment and development of cooperatives are set out, and the historical development of Danish cooperatives and the associated factors and globalization processes are mapped. The current status of cooperatives with regard to market shares and international competitiveness are analysed, and on this basis the latest developments in terms of globalization, equity, growth, employment, etc. are also analysed. Finally, based on the Danish experience and based on different inputs from less developed countries, the transfer of experience from Danish cooperatives to countries with a less developed cooperative industry is assessed.

Theoretical framework and methodology

An important methodological problem is to measure the performance and the potential benefits of cooperatives. First, it is impossible to compare with a situation without cooperatives (a counterfactual scenario). Second, there are also a number of more or less invisible benefits of cooperative ownership. The benefits of cooperative ownership may become invisible to farmers when cooperatives dominate and when farmers are under economic pressure. Farmers often realise that the prices of their products rise less than their costs and less than other goods. Therefore, criticism is directed towards the companies that buy their agricultural products, which in many cases are cooperative companies. However, it is unreasonable to blame cooperatives for the decreasing real prices and deteriorating terms of trade faced by farmers as agriculture and food usually become cheaper each year. Also, the value of security

of supply, democratic influence, access to added value and earnings upstream and downstream can also be invisible benefits that are difficult to quantify.

Third, it can be difficult to benchmark economic performance in cooperatives and in capital owned companies respectively. In cooperatives, members have benefits in the form of better purchase and sale prices as well as having a part of the profits. In capital-owned companies, the owners have benefits in the form of a share of the profits and increasing value of their investment. Therefore, comparing economic performance in the two types of companies is not so simple. One method is to estimate the economic performance and competitiveness based on the market shares of the companies. The basic idea is that competitive companies will outperform other companies and thus increase their market share.

Fourth, a farmer owned cooperative is not a unique concept. Cooperatives can be found in both primary agriculture and in up- and downstream industries. This article does not address cooperatives in primary agriculture. In addition, cooperatives exist in many different forms, intermediate forms or as "semi-cooperatives".

Another important methodological problem is how to analyse the possibilities of transfer of experience. In this article, this is done based on an identification of the preconditions that create and promote cooperatives. To the extent that these prerequisites are very country specific, it will – *ceteris paribus* – be difficult to transfer experiences from one country to another. The specific assumptions and conditions are evaluated on the basis of literature studies, field studies and inputs from key persons in countries, where cooperatives are present to varying degrees.

Advantages and disadvantages of cooperatives vs. capital-owned companies

Cooperatives have a number of advantages and disadvantages in relation to capital owned companies. This means that cooperatives are not superior in all respects, and the net advantages depend on the specific situations and market conditions. A number of significant advantages and disadvantages of cooperatives compared to capital owned companies are identified in Table 1.

Table 1. Cooperatives: Significant advantages and disadvantages compared to capital owned companies.

Advantages	Disadvantages
Strong vertical integration Through cooperative ownership several links in the value chain can be controlled	Difficult to attract equity The potential for attracting external capital is limited
Low transaction costs The supply chain is effective and supplies between the links are often at no cost to intermediaries or other sales links.	Volume control is difficult Because of members' delivery rights, cooperatives have limited scope for volume control.
Security of supply and demand Both farmers and the cooperative have secure supply and demand.	Conflict of interests and dual role Members' dual role as both owners and suppliers (or customers) can cause conflicts.
Relatively small demand for capital The supply obligation acts as a financial cushion, and thus the need for equity is reduced.	Lack of incentives for long-term investments Since the cooperative owners basically cannot withdraw their share of the value added from the company when they drop out, their economic incentive to leave money in the company for long-term investments and return can be limited.
Division of labour Farmers can focus on core business - to be farmers - and leave up- and down-stream activities to their own cooperatives knowing that all benefits from this belong to and are returned to the farmers / members.	Limited recruitment base to the board Positions on the board are predominantly reserved for members, which results in a significantly reduced basis for recruitment
Cooperatives are often economically robust The cooperative structure with the obligation to supply, etc. means that it is relatively rare that cooperatives go bankrupt.	Ties to produce Cooperatives may have an implicit or explicit tie to the members' own supply of raw produce, which can cause non-optimal commodity composition.
Evens out market power in the value chain Agricultural production typically comes from many small units which individually have weak market power. By standing together in cooperatives, the bargaining power of these small units is strengthened, and it becomes more equal in relation to the other links in the value chain.	Focus on value chain around members Cooperatives will, by virtue of their aim to protect the supply and sales of their members, often focus on the links of the value chain, which lie closest to the members. Activities further down the value chain closer to consumers can therefore be assigned a lower priority, even though they may be economically attractive.

The Table emphasizes that the cooperative model can have significant and substantial advantages and disadvantages. Cooperatives can thus be advantageous in situations where the special benefits are important and can be utilized. However, there may also be situations where the disadvantages are too crucial or where the benefits are less important.

Driving forces behind the formation and development of cooperatives

The assumption that cooperatives can have their financial justification and legitimacy is based on the premise that there is a need for cooperatives, that there are driving forces or conditions that stimulate the establishment of cooperatives. The extent to which cooperatives can survive and grow nationally or internationally depends on the

following market conditions which can make it more or less advantageous to establish –or maintain– cooperatives:

1) No or only weak market power in existing supplier associations, etc.

Farmers can often achieve a degree of market power by establishing supplier and producer associations, which have bargaining power towards their supply and processing companies. In these situations, the benefits of establishing a cooperative are less. Conversely, the absence of such supplier and producer associations increases the incentive to establish farmer-owned cooperatives.

2) Insufficient competition up- or downstream

Fundamentally, cooperatives are created because a group of farmers need to solve an important market problem. If there is insufficient competition up- or downstream, the market will be imperfect, and the farmers' market power will be adversely affected. Therefore, there is an incentive to establish cooperatives in these industries.

3) Farmers' professional, democratic and social skills

The establishment, organisation and operation of a cooperative implies the appropriate professional, democratic and social skills by the members. Farmers need to understand and respect the common rules, and to have the ability to cooperate and to recognise mutual benefits.

4) Delivery guarantee can be crucial for farmers

When agricultural products are sold on a daily basis, or almost daily, an efficient sales organisation and the right to deliver is crucial for the farmers. For dairy farmers, it is important that the milk can be delivered every day, while it is easier for grain producers, for example, to store grain and spend time evaluating alternative sales opportunities. Therefore, the right to deliver and, thus also, the value of being a member of a cooperative is more important in some industries than in others.

5) Legislation promotes cooperative ownership

Legislation may be a significant driver for the establishment of cooperatives in several areas. In a number of cases, the government supports the formation and development of cooperatives through special support schemes, exemptions or other kind of legislation.

6) Financial structure and needs

The financial situation of cooperatives, including the cooperative's capital needs relative to the number of members, also has an impact on the significance of cooperatives. If processing activities are highly capital intensive, and

if there are very few members, the capital requirement per member will be so large that the cooperative model will be unsuitable, especially if there is a start-up phase.

7) Position in the vertical value chain

Usually, farmers will establish cooperatives in industries close to the agricultural production in the vertical value chain. Downstream activities very close to consumers typically have lower cooperative market shares (Hansen, 2013). The reason is probably that cooperative involvement by farmers in industries close to the agricultural production often has a more direct and transparent advantage for farmers.

The drivers can thus be both internal and external in relation to the cooperatives: The cooperative structure in itself can be more or less advantageous in the individual cases. In addition, a number of external factors such as competition, market power and legislation can be key drivers or barriers to the establishment and development of cooperatives. It is evident that the driving forces behind the formation and development of cooperatives may be more or less present in different countries and thus cooperatives may have varying eligibility and extent. It also means that a low degree of cooperative organization *per se* is not negative, as the right drivers and conditions must be present to make cooperatives useful and successful. In other words, cooperative organization is not a goal *per se*. It is a means of ensuring a more efficient value chain, and thus a better earning for the cooperative members, the farmers.

The historical development of Danish farmer owned cooperatives: The process

In a study of the significance, development and experiences of the Danish cooperative industry, the historical development –from the very beginning– must necessarily be an important basis. The process of growth, structural development and creating competitiveness has developed over many decades. The first farmer owned cooperatives were established in the 1880s. The subsequent development and the transformation from small domestic oriented companies to huge transnational companies was driven by a number of political and economic conditions. The major stages in this development and structural processes of Danish cooperatives are shown in figure 1.

Economic and political conditions										
	1860	1880	1900	1920	1940	1960	1980	2000	2020	
Globalization	Folk high schools flourish Liberal import policy WWI WWIII EC and Common Agr. Policy (CAP) Marshall plan Denmark member of EC/EU CAP: Transformed and liberalised EU enlargements GATT/WTO liberalisations Tightened competition legislation									
	Access to cheap cereal from North America, Ukraine etc. Increasing export orientation Diversification of export markets Export to close markets Export market shares of 70-80% for major products Extra-Europe export increasing: Middle East, Japan Global offshoring Transnational cooperatives Foreign M&As: Inward and outward waves									
Structural development	Transformation: From crop production to livestock-based agriculture The Federation of Danish Cooperatives is established Cooperatives dominate in most industries Domestic merger waves Consolidation Number of coop pig slaughterhouses peaks Concentration Hybrid companies: Coops and capital The "Dairy company Denmark" (MD) is established Number of coop dairies peaks Growth and economies of scale The cooperative model is reassessed and changed									
	1860	1880	1900	1920	1940	1960	1980	2000	2020	

Figure 1. The development of Danish farmer cooperatives: Drivers and development.

The industrialisation and the globalisation of Danish agriculture and agribusiness started gradually as early as the end of the 19th century. Increasing international competition and price pressure on the international grain markets were drivers of a significant transformation, in which the production and export of animal products such as butter, eggs and meat increased. In later stages of the globalisation process, the diversification of export markets and the export of goods to more distinct markets have characterised the development, indicating a more advanced stage of the globalisation process.

Recently, foreign direct investment, global strategic alliances and production abroad have also been major elements in the globalisation process. Since the beginning of the transformation process at the end of the 19th century, the Danish agricultural sector has focused on cooperatives as a main driver for development and globalisation. The overall aim was to ensure farmers' market power and market access in the marketing chain through the establishment of cooperatives in most agricultural sectors, both up-stream and down-stream. The market share of cooperatives increased, and during the last decades a remarkable wave of mergers among agribusiness companies, and especially cooperatives, has occurred. Structural development through consolidation and concentration has dramatically increased the competitiveness of companies.

Danish agricultural cooperatives at a glance: The long-term development

Danish agricultural cooperatives have a tradition going back to the 1880s. A study of the long-term development up to today can identify some of the basic trends that have shaped the development. In general, for a number of decades, cooperative ownership in the agri and food industry has been increasing (Figure 2).

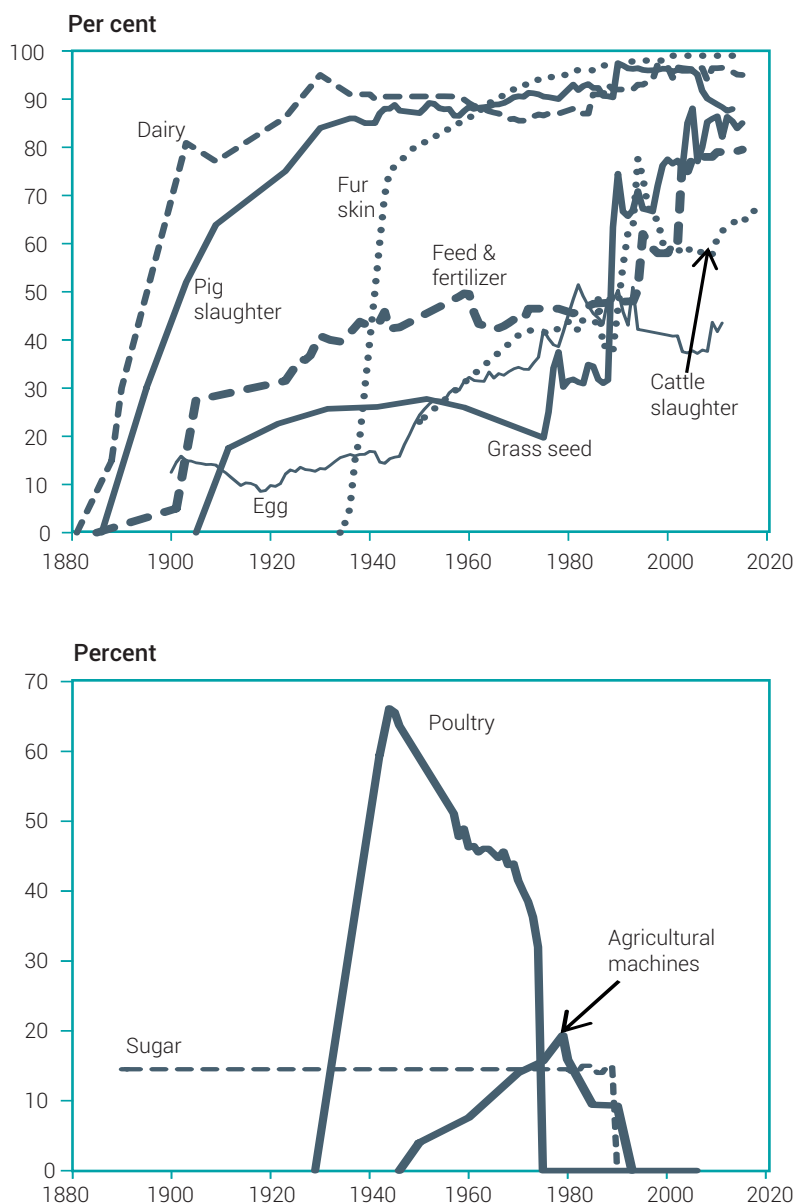


Figure 2. Market shares for agricultural cooperatives in selected industries in Denmark

Sources: Own calculations based on Statistics Denmark (several issues), Danske Andelsselskaber (several issues a+b), DLG (1973, 2019), Danish Agro (2020), Danish Dairy Board (1982), LF (2020a, b, c) and annual reports from food companies and organisations.

As shown in Figure 2, cooperative ownership has, in general, increased during the period. However, the figure only shows only a sample of the agri food industries where cooperatives have existed. Cooperatives also exist –or have existed– in industries such as fruits and vegetables, potted plants, potatoes, potato starch, beverage

and fish. Figure 2 shows the significance and market shares of cooperatives has developed very differently from industry to industry. The industries can thus be divided into different categories depending on the extent and progress of the cooperatives over time:

Category 1. Significant market shares from the beginning of the cooperative era, and the level is maintained up to the present time

- Pig slaughterhouses
- Dairies

Category 2. Initially small market shares, but they have grown gradually and today they are significant:

- Grass seed
- Feed and fertilizer etc.
- Cattle slaughterhouses
- Eggs
- Fur skins

Category 3. Cooperatives have existed, but no longer or at very low levels:

- Sugar
- Poultry slaughterhouse
- Ostrich meat marketing
- Agricultural machinery
- Bread
- Financing/banks
- Insurance

Category 4. Cooperatives have not existed or have not had any real significance

- Beverages, juices etc.
- Processed vegetables

It is worth noting that most cooperatives were established in a bottom-up process driven by the farmers, except for the poultry slaughterhouses which were established by law in the 1930s. Furthermore, it is also remarkable that cooperative ownership is most important in the processing activities that are closest to the farmers in the value chain, or where agricultural commodities represent a large proportion

of the total retail price. This is a general phenomenon among cooperatives (Rogers, 2000; Hansen, 2012b, 2013).

The period back from 1880s is also characterised by considerable structural development. In the first decade of the cooperative movement, a large number of cooperatives were established. Indeed, by 1900, about half of what would be the eventual highest number of cooperative dairies and slaughterhouses had already been established (Figure 3).

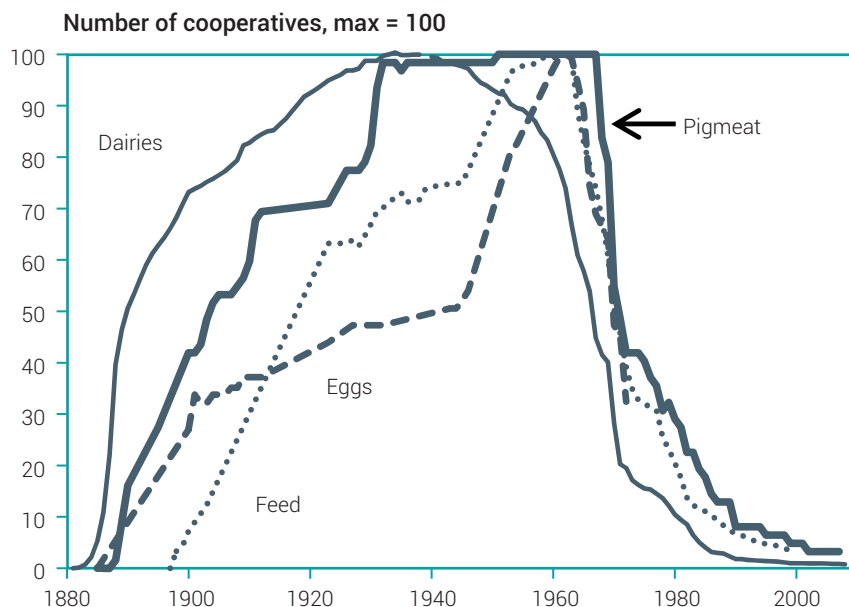


Figure 3. Number of cooperatives in selected industries in Denmark.

Sources: Own calculations based on Statistics Denmark (several issues), Danske Andelsselskaber (several issues a+b), DLG (1973), Danish Dairy Board (1982), LF (2020 a+b) and annual reports from food companies and organisations.

The development of the industrial structure among Danish agri food cooperatives has been very rapid during recent decades. The number of firms has decreased dramatically and today only a few –but rather big– firms have survived. Figures 4 and 5 highlights the structural changes and adjustments.

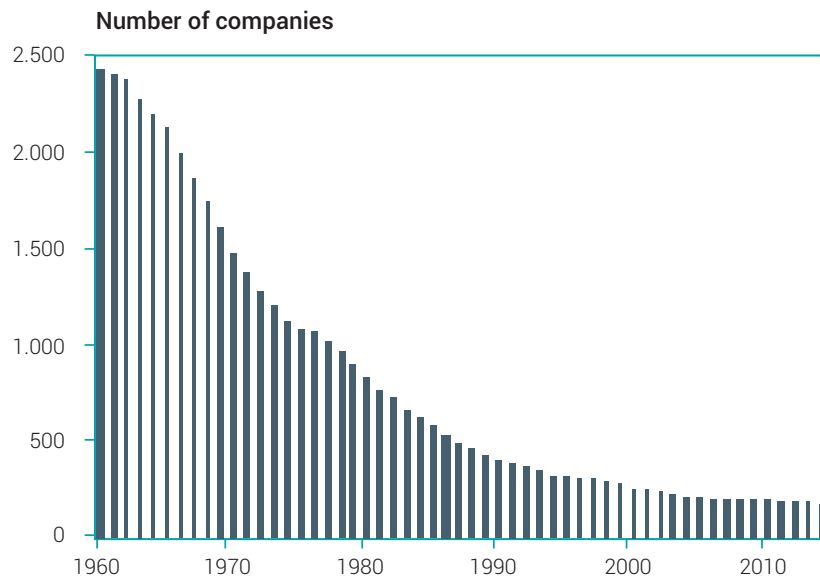


Figure 4. Number of companies in the Danish agri and food industry.
Note. Total number of companies in 17 major sectors in the Danish agri and food industry.

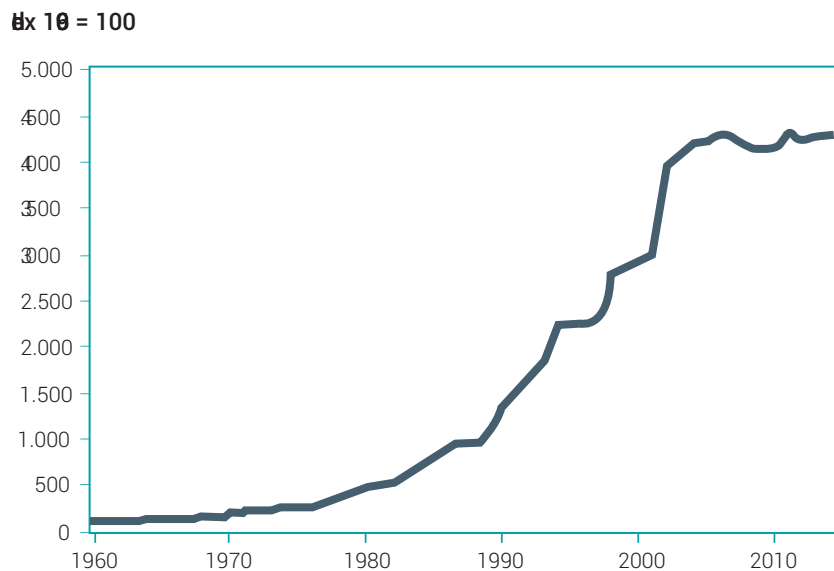


Figure 5. Development in average company size in the Danish agri and food industry.
Note. Weighted index (volume) of 17 major sectors in the Danish agri and food industry.

The result has also been increasing concentration ratios in almost all groups of the food industry. In this case increasing concentration means that large companies are gaining an increasing share of the market. Although the general, "average" trend in the agri food industry includes significant differences, there is a relatively clear trend, Figure 6 thus illustrates the concentration trend using the commonly used index of concentration ratio, the HHI index, for the period 1960-2018.

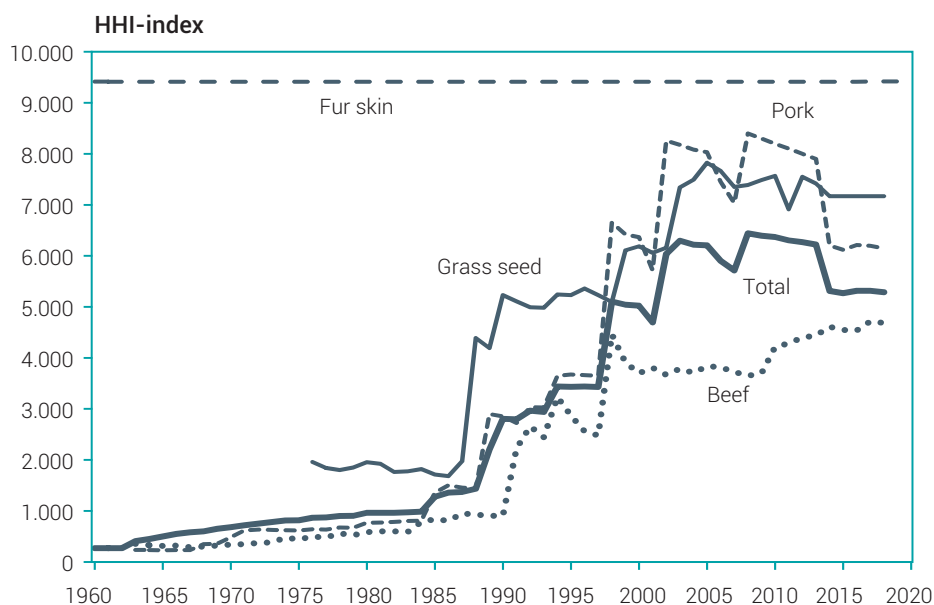


Figure 6. Concentration trends in selected Danish agri and food industries.

The figure shows concentration trends for selected industries dominated by farmer cooperatives.

Over the past decade, the development in both size, number and concentration has slowed down and now a reversal of the trend compared to previous seems to occur. Several explanations for this can be identified.

First, the consolidation (through mergers and acquisitions) in the Danish agri food industry is almost complete, so opportunities to grow further through domestic acquisitions and mergers are almost exhausted.

Secondly, in several industries, especially illustrated in the brewery industry, a number of smaller niche companies have emerged and managed to survive and develop in the shelter of the few large market leading companies. This development contributes, *ceteris paribus*, to more companies, a decrease in average size and a decreasing consolidation.

Third, the Danish supply of agricultural commodities is limited, which also reduces the growth opportunities for the domestic-based agri and food companies. Previously, quotas on both milk and sugar have limited the quantities of raw materials. In recent years, the decline in Danish production of slaughter pigs has also had a negative impact on the structural development of the meat industry.

Fourth, an increasing share of growth is created in foreign markets and to a large extent based on foreign raw materials.

Agricultural cooperatives today

Recent decades have been characterised by consolidation, mergers, acquisitions and internationalisation, which have resulted in just a few, very large cooperatives, which have become some of the largest in the world, despite having a relatively small number of members and farmers (Table 2).

Table 2. Danish farmer owned agricultural cooperatives: Size (ranking in Europe).

Industry	Ranking	Company
Pork	2	Danish Crown
Beef	7	Danish Crown
Dairy	2	Arla Foods
Feed industry	2	DLG
Grass seed	1	DLF Seeds
Raw fur skin trade	1	Kopenhagen Fur
Potato starch	2	KMC

Note. Arla is a transnational cooperative with members in 7 countries. Formally, the company is domiciled in Denmark. DLF Seeds and Kopenhagen Fur are both the largest in the world within their particular business segments. It is often difficult to compare the size of companies as some have activities in many different areas. Size is measured as the gross revenue in the specific industry segments mentioned in the table.

The figures are remarkable considering that Denmark accounts for less than 0,5 % of the total economically active population within agriculture in Europe, and less than 0,7 % of the total agricultural land in Europe. In a previous section, the development of cooperatives' market shares for selected sectors is presented. The present situation for a number of several industries and subgroups is shown in Table 3.

Table 3. Market share (%) for cooperatives in Denmark, 2018.

Business	Market share
Pig slaughtering	86
Pig production	68
Beef slaughtering	67
Meat processing	52
Dairies	
- milk intake	94
- milk, consumption	100
- butter	99
- cheese	91
Fur	98
Sugar	0
Poultry	0
Agri. machinery	0
Feed, fertiliser etc.	82
Eggs	58
Grass seed	85
Potato starch (intake)	100

Source: Own calculations based on LF (2020a, b, c) and annual reports from companies and organisations.

The location of the industries in the four categories is far from random, and a number of explanations can be given as to why the industries are precisely placed in the categories as they are, see the paragraph: "driving forces behind the formation and development of cooperatives". In industries such as dairy and pork, farmers must rely on daily deliveries from the farm to processing companies, and therefore cooperatives give farmers some kind of assurance and trust. This explains the large market share of cooperatives within the milk and pork processing industries. Transaction costs and the farmers' share of total marketing costs also explain a part of the market share. In other industries, the success or failure of cooperatives can be explained by managerial competence.

According to Hansen (2009), Danish cooperatives are expected to at least maintain their market share in the coming years. In general, the fundamental concept of the cooperative will remain unchanged. Cooperatives consider globalisation as a positive challenge with some seeing cooperative ownership as an advantage during globalisation. Finally, it should be stressed that cooperatives operate mainly in the supply and processing industries. When it comes to farms and primary agricultural production, cooperatives do not play any role at all.

The correlation and causal relationship between cooperative structure, domestic and international market shares and their international competitiveness is clear. The well-developed structure allows the cooperatives to utilize economies of scale, market power and internationalization

The international competitiveness of Danish agri and food business is reflected in the fact that their world market shares are remarkably high. Despite the fact that resources in Danish agriculture are rather limited, the sector plays an important role on the global market, as export, in several cases, has a high share of total international trade and is even dominant in some important cases (Table 4).

Table 4. World market share (export) of selected Danish agri and food products (2013).

Products	World market share (%)	Rank (no. in World)
Raw mink skin	37	1
Grass seed	26	1
Meat of swine	11	3
Meat of swine: Ham	19	1
Meat of swine: salted/dried/smoked	19	1
Live swine	18	2
Cheese and curd	5	5
Cheese, blue-veined	25	1
Butter	4	9
Live plants	4	5
Live plants, roses	9	4
Farmers*	0,005	148
Agricultural area	0,05	111

* Economically active population in agriculture

Source: UN (2015) and FAO (2015).

During recent decades, Danish agri and food cooperatives have increased their foreign direct investment significantly. Production, processing, innovation etc. in foreign subsidiaries or joint-ventures now play an increasing role, and this further step in the globalisation process will also lead to the transfer of knowledge to foreign countries. Foreign direct investments from Danish agri and food cooperatives have taken place in all regions of the world.

Recent economic and structural development

Since 1970, all large companies in the agri and food industry have increased their export share (exports as a share of total production). However, internationalisation measured by parameters other than export shares has also increased - and in many cases faster. Measured on the use of foreign raw materials, foreign assets or turnover in per cent of total, the development over the past few decades has in many cases gone much faster. Figure 7 shows examples of these forms of internationalisation.

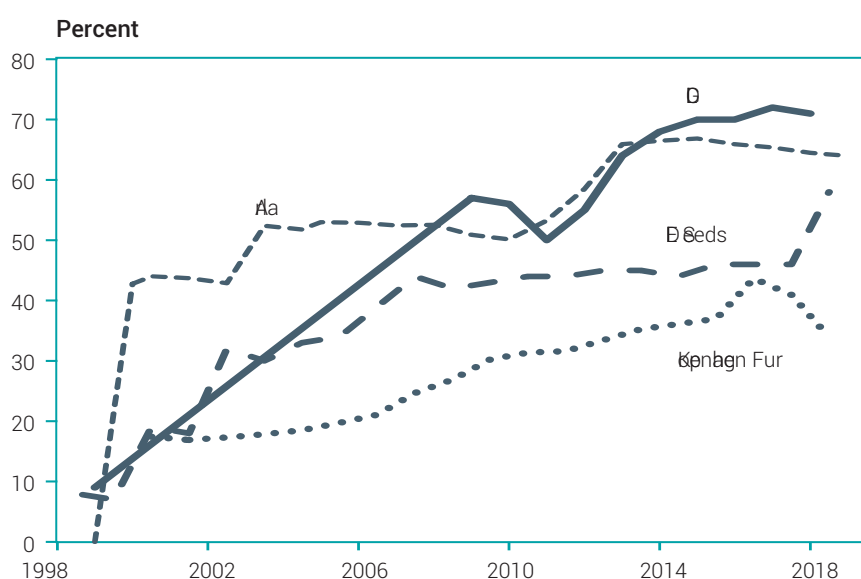


Figure 7. Development in globalisation for selected Danish agri and food companies. Per cent foreign share.

Note. Arla: Milk intake from foreign farmers. Transnational dairy cooperative with head quarter in Denmark, but with increasing deliveries from foreign cooperative members now accounting for over 60 percent of all milk intake. DLG (Danish Farm Supply Cooperative): Turnover from foreign activities. From 1999 to 2018, turnover based on foreign activities has increased from 10 per cent to 70 per cent. DLF Seeds: Assets in foreign countries. Assets in foreign countries now account for more than 50 per cent in 2020. Copenhagen Fur: Foreign fur skins to be sold on fur auctions. Intake of foreign skins for the auctions is now 34 per cent of total intake – compared to 18 per cent in the beginning of the 2000s.

The figure emphasizes that globalization is not just a matter of international trade, but that foreign members, assets, intake, investments also play an increasing role. The internationalisation and consolidation phase of recent decades has required resources in the form of both capital and organisation. In recent years, internationalisation has increasingly taken place in the form of foreign direct investments, which has led to an increased focus on the capital ratio of cooperatives. In general, equity is

relatively low in cooperatives as the members are obliged to deliver their products to the cooperative and the economic solidarity among the members reduces the need for financial buffers in the companies. In addition, there are certain mechanisms embedded in cooperative ownership which limit the accumulation of equity.

Despite structural problems and barriers to building equity in cooperatives, in general, it is increasing in the agricultural cooperative industry. As shown in Figure 8, in recent years equity has risen significantly in the largest Danish agricultural cooperatives.

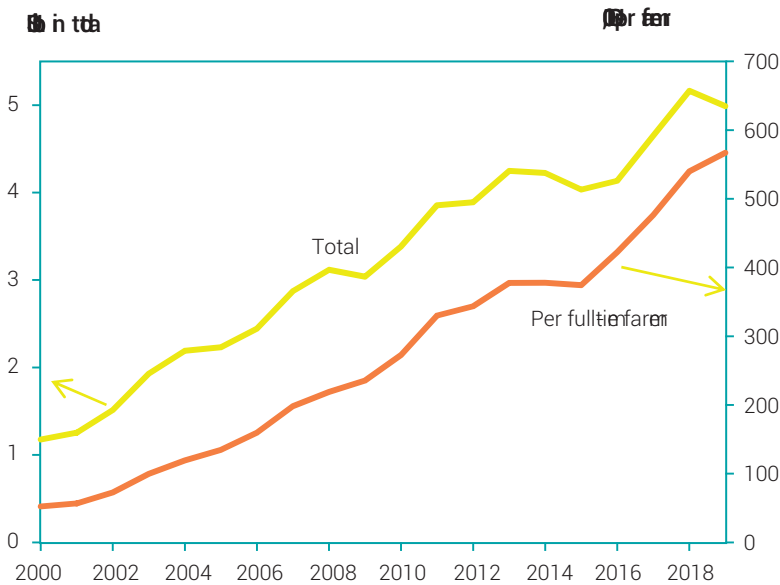


Figure 8. Size of equity 2000-2019 in the 28 largest Danish agricultural cooperatives: Total equity and per full-time farm.

Note. Excluding share of equity connected to foreign cooperative members (Arla Foods)

Source: Statistics Denmark (2020c) and annual reports from the companies

The figure shows that equity has risen considerably during the period: From 1 bn USD to almost 5 bn USD. The increase is due to two major factors: First of all, capital requirements are rising due to structural developments, acquisitions, utilisation of economies of scale, reduced access to external financing, etc. Secondly, there is a clear trend towards fewer farmers and cooperative members. These trends are increasing the pressure on the cooperative members to accumulate more equity per farmer in the cooperatives. Therefore, the equity capital of the cooperatives is increasing considerably when measured per cooperative member, or per full-time farm, as shown in Figure 8.

As the figure illustrates, equity capital in the 28 largest cooperative companies now amounts to almost USD 0,6 million, on average, per full-time farm in Denmark. The relative size of equity is often presented using the equity ratio. The equity ratio is equity in per cent of all assets. In general, the equity ratio of cooperatives in the Danish agri and food industry is relatively low compared to the average equity ratio in the Danish industry (Figure 9).

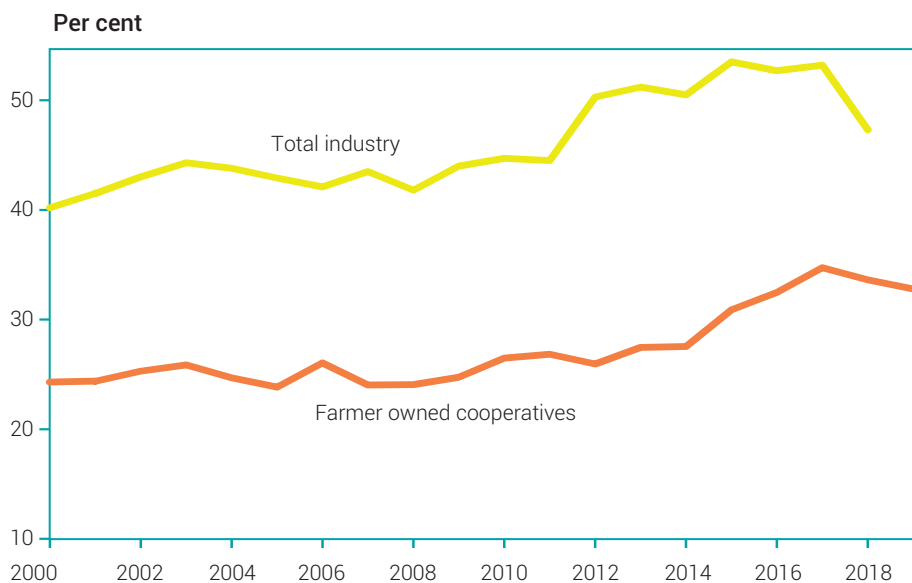


Figure 9. Equity ratios in Danish industry in total and in the 28 biggest farmer cooperatives in Denmark.

Source: Statistics Denmark (2020a) and annual reports from the companies

The figure shows a significant difference in the equity ratios between the total industry and the farmer cooperatives. The equity ratio is in the interval 40-50 per cent in industry in total and around 30 per cent in the cooperatives. The difference in equity ratios seems to be relatively stable and constant. The figure also shows that since the beginning of the financial crisis there has been an increasing equity ratio in both groups.

If the focus is only on larger companies in the agri and food sector, a significant difference in the equity ratio can again be found, as the average equity ratio of cooperatives for the period 2003-2018 is 27 per cent, while for other types of companies (typically shareholding companies) it is 41 per cent. However, the equity ratio has been increasing over the past few years (figure 10).

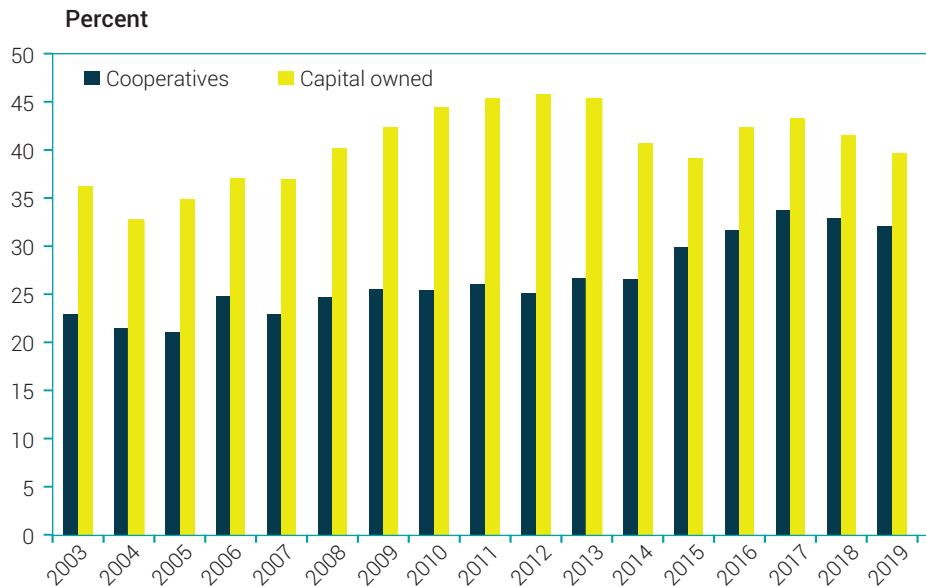


Figure 10. Equity ratio for Danish agri and food companies. Cooperatives and capital owned companies.

Note. Companies with an annual turnover > ½ bn DKK (80 mn usd)

Figure 10 shows the equity ratios among bigger cooperatives and non-cooperatives in the agri food industry in the years 2003-2019. The figure also shows that non-cooperatives (primarily shareholding companies) in the agri food industry have an average equity ratio below the average for the whole industry (40% compared with 47%), while the agri and food cooperatives have an average solvency ratio of 32%.

The relatively low equity ratio of the farmer cooperatives is partly due to the fact, that the members are obliged to deliver all their products to the cooperative, which makes the cooperatives relatively economically robust. Aided by this obligation to deliver all their products and based on statutes, farmers are often a financial buffer for cooperatives: Farmers receive the positive and negative fluctuations in earnings, as prices to farmers are continuously adjusted, so that cooperatives have a rather constant profit from year to year. As a result, historically, cooperatives in the agri food industry rarely encounter such serious financial problems that they end up with bankruptcy or loss to creditors. Banks have relatively small losses on their exposures to cooperatives.

The fact that profits in cooperatives are more constant than in other companies has been examined by comparing the frequency of annual deficits in different types of companies in Denmark. During the 16-year period 2003-2018, the 12 included

cooperatives had a negative result in 3 per cent of the years, while the corresponding figure for other types of company was 20 per cent (Figure 11).

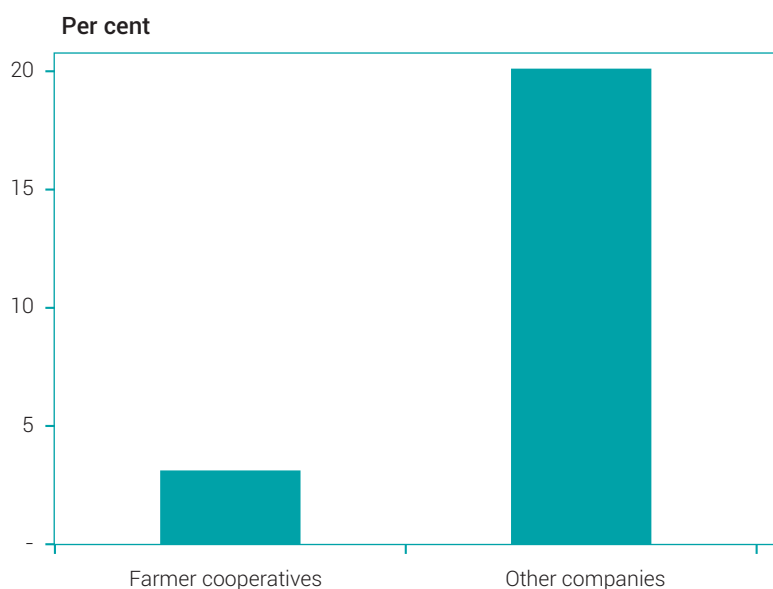


Figure 11. Frequency (%) of negative results after tax in farmer cooperatives and other companies in the Danish agri and food industry, 2003-2018.

Note. Companies with an annual turnover > ½ bn DKK (80 mn usd)

However, it should be noted that several of the foreign multinational companies such as Nestlé and Unilever had negative results in most years, affecting the average, although that did not change at the conclusion.

As mentioned, the number of full-time farmers and the number of cooperative members is decreasing. As shown in Figure 12, the number of members (measured here as the number of memberships) in the period 2000-2018 has decreased significantly (-32 per cent).

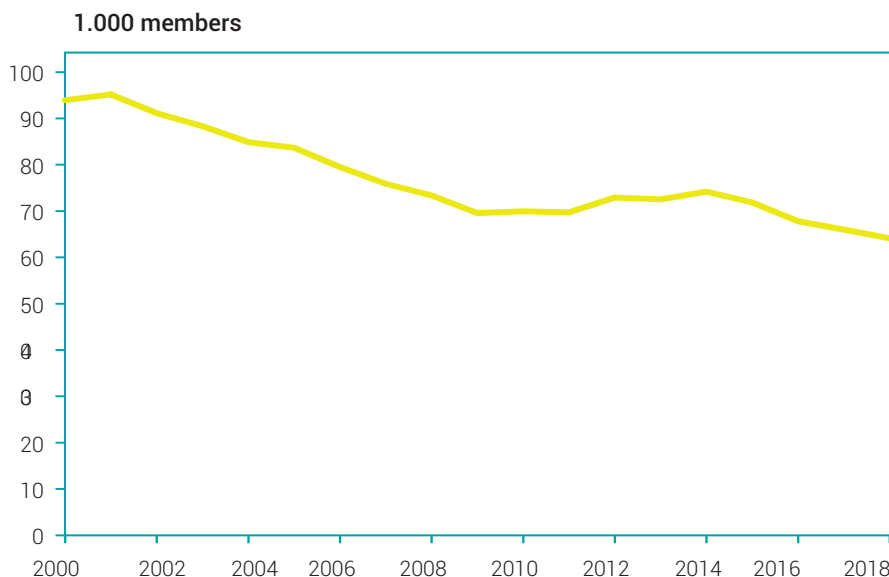


Figure 12. Number of members (memberships) in Danish cooperatives 2000-2018.

Note. The figures include only members of cooperatives based in Denmark. In 2018, there were a further approx. 9.000 foreign members of cooperatives based in Denmark (Arla Foods). In the same period the number of full-time farms has decreased by 57 per cent.

The number of members is a proxy of the attractiveness of the cooperatives: If the cooperatives manage to increase their competitiveness, they can make membership more attractive and thus they can increase the number of members. In many cases, farmers are members of several cooperatives: Thus, it would be advantageous to be a member of both a farm supply cooperative and of a dairy and/or slaughterhouse cooperative. For that reason, the number of memberships is higher than the number of members.

When it comes to the number of employees in the cooperatives, a number of drivers affect developments in widely different directions. On the positive side, with the rising market shares of the cooperatives, a similarly increasing share of employment in the cooperatives would be expected. Furthermore, the added value and processing in the agri and food industry is generally increasing, which will increase the demand for labour.

In the negative direction, increasing use of technology, improved productivity and increased use of machinery and capital will reduce the demand for labour. With annual productivity growth of 5-6 per cent, a significant increase in production is required just to maintain the level of employment.

Finally, it is also important that a continuously increasing share of the employment by cooperatives is located abroad. Increasing employment in foreign countries may be the result of international mergers and acquisitions, or a result of offshoring of labor to countries with lower labour costs. In total, since 2000, there has been an increasing employment in the Danish farmer cooperatives in the agri and food industry (Figure 13).

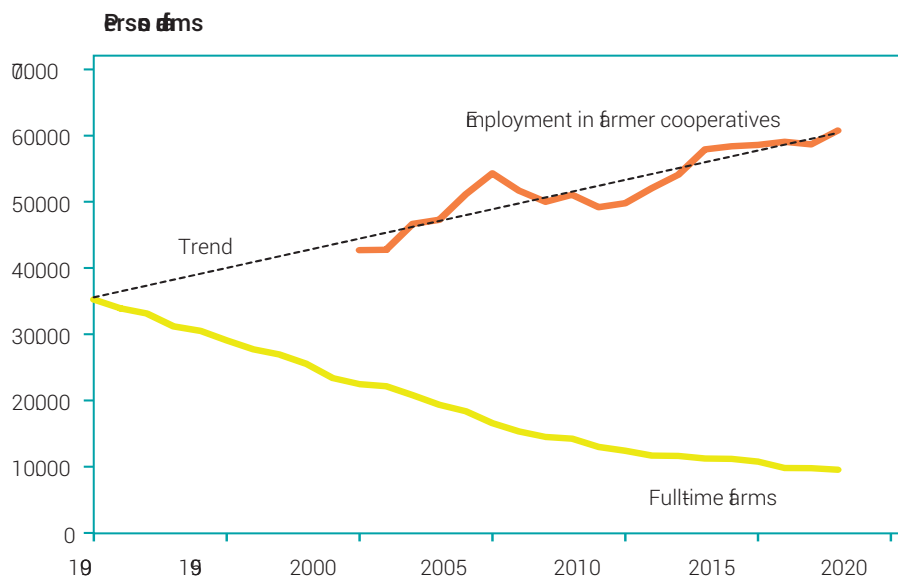


Figure 13. Employment of farmer cooperatives and number of full-time farms in Denmark.

The figures only include direct employees (and not derived employment) and include employees in both Denmark and abroad. The figure also illustrates that employment in cooperatives is increasing, while the number of full-time farms is declining. In 2018, there were an average of 6 employees in the cooperatives per year full-time farm. The cooperatives account for more than 50 per cent of the turnover in the Danish agri and food industry, and in recent years the market shares have been increasing (Hansen, 2015). The annual growth of revenue in the cooperatives has been rather strong compared to other companies. Thus, during the period 2003-2018, the average revenue growth in the cooperatives was almost twice as high as in other companies (Figure 14).

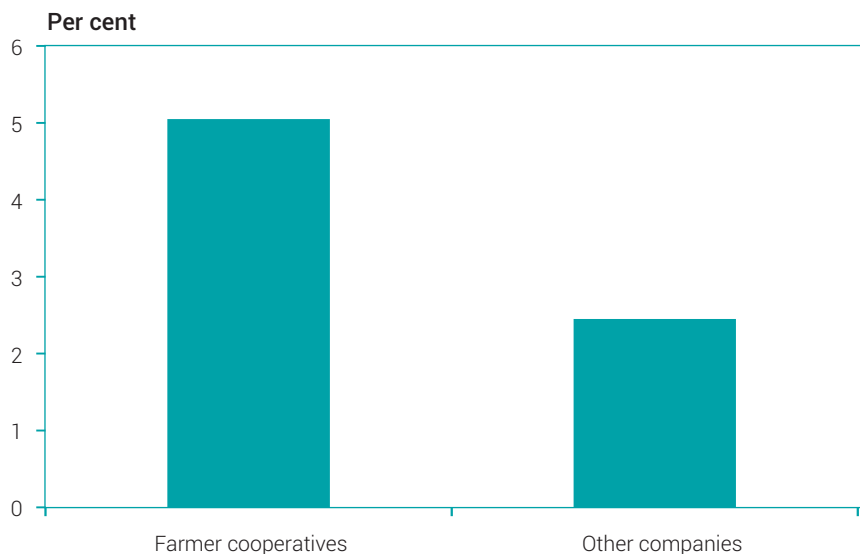


Figure 14. Average annual revenue growth in cooperatives and in other companies in the agri food industry, 2003-2018.

Note. Companies with an annual turnover > ½ bn DKK (80 mn usd)

The increasing revenue growth is due to both mergers and acquisitions (M&As) and organic (i.e., other) growth. As market growth in the food segment is rather low, food consumption is relatively constant, a large part of the growth will come from M&As. The relatively large growth of cooperatives can be explained by several factors: The cooperatives may be positioned in markets or areas where the economies of scale are significant, and where the benefits of M&As are substantial; another factor may be that the cooperatives have a competitive advantage which makes it easier for them to expand. In addition, several of the Danish cooperatives in the agri food industry have clear and well-defined growth targets in their strategies (Hansen, 2005, 2011, 2012b).

Finally, there are also indirect growth generators in cooperatives. The explanation is that cooperatives generally have open membership, and this means that new members have access to cooperatives and can obtain the same prices and conditions as the other members. The is also the case even if the increased supply from new members is economically unattractive for the cooperative, because this marginal production must be sold in less attractive markets.

In this way, cooperatives cannot make supply management, in the same way as other companies without open membership. The result is that cooperatives often have a mechanism that results in increased growth and rising market shares.

Market access and cooperatives

Agriculture and the food industry often face a challenge: How to gain access to the market? Many small farms must sell their products daily, but the way to consumers can be very difficult: Farmers' individual bargaining power is very weak, and farmers may often have problems with regard to logistics, delivery security, high transaction costs, etc. These challenges may seem insignificant, but many less developed, and even some well-developed countries, have serious problems with farmers' access to the markets.

Cooperative ownership can, to some extent, solve these problems: When farmers join forces to establish and operate a cooperative, they know that stable, daily deliveries will be guaranteed, and that the cooperative's profits will be returned to its members. A large cooperative also has much greater bargaining power than an individual farmer, which is a significant advantage in negotiations with the increasingly large retail chains. In this way, cooperatives can create an improved competitive situation. Furthermore, farmers do not need to use resources in order to find customers for their products on a daily basis or worry about the buyers of their products cheating them and keeping the profits of downstream processing and marketing.

Additionally, from a socioeconomic point of view, the establishment of cooperatives is also often advantageous: In a situation with many small farms and no cooperatives, imperfect markets, high transaction costs and a lack of vertical integration may occur. All these weaknesses can lead to socioeconomic losses.

In many developing countries, agriculture is facing increasing competition: Large international companies are sourcing agricultural raw materials, and European retail chains are finding an increasing number of food suppliers in developing countries. This means that many farmers have, directly or indirectly, to deal with a few large buyers. The bargaining power of these farmers is very weak, and a very large part of the profit from downstream processing and marketing is captured by others rather than the farmers. Therefore, supporting and strengthening the farmers' market and bargaining power is becoming increasingly necessary.

Can Danish experiences be transferred?

The question is if the Danish model of cooperative ownership in the agri food industry can be transferred to other countries? The Danish model of cooperative ownership is based on a long tradition of mutual trust, loyalty and, not least, a "bottom-up" approach, which means that the farmers themselves have established and developed

the cooperatives. When farmers see the need, the solution and the benefits, strong ownership of the company arises. In contrast, if cooperatives were instead established by the authorities, many farmers would be sceptical in advance and probably would not give as much support. This is one of the reasons why cooperatives in developing countries are less common than desired.

Based on a number of inputs from such countries with limited cooperative ownership (IFRO, 2018), a number of experiences and assessments can be summarised (Hansen, 2019):

- A greater number of agricultural cooperatives in the less developed countries will provide clear opportunities to strengthen the value chains, thereby improving food quality, security of supply, market access and farmers' market power. To a large extent, the results from the Danish farmer cooperatives meet the needs of farmers in many less developed countries.
- Lack of collaborative experience among farmers is a significant barrier to the establishment of new cooperatives. There are a number of implicit and explicit rules of the game with regards to cooperatives which are not always observed. This may be due to a lack of an incentive or a lack of understanding of the cooperation.
- There are major financial barriers to establishment. For example, establishing cooperative dairies or slaughterhouses requires investment from both cooperative members and financial institutions. The cooperative form of ownership can be a limitation and a disadvantage when it comes to financing start-up companies.
- There are major organisational barriers to establishment. Often, the full support of many cooperative members is required, and significant labour resources are necessary.
- Lack of or weak infrastructure such as transport facilities, legal conditions, etc. can prevent the establishment of cooperatives.
- Resistance from existing companies. Entry barriers put up by existing companies will appear.
- Cooperatives do not emerge "by themselves". Although there are obvious advantages for farmers connected with establishing more cooperatives, and although farmers should be the drivers behind this, support to establish a new cooperative will still often be needed. Even though the involvement of the government should not be excessive, it will often be necessary to facilitate and support a start-up.

- Cooperative ownership can take many different forms and can arise at different stages of the value chain. In the Western world, cooperatives are mainly found in the agricultural supply and processing industry, where family-owned farms dominate agriculture. In Asia, for example, cooperative ownership in the primary agricultural industry is also widespread. The governments often want to facilitate more cooperative farms, but it is difficult to find and transfer experiences from the West.
- Subsistence farming, in its various forms and nuances, is very important. Subsistence farming is most prevalent in sub-Saharan Africa, in Southeast Asia and in parts of South and Central America. In East Africa, subsistence agriculture accounts for 70-90% of production. Small farms, which in a development perspective are often synonymous with subsistence farming, account for 80 per cent of food production in developing countries (FAO, 2011). It is obvious that for these farms, cooperatives have far less relevance than for more commercial and market-based agriculture.
- Cooperatives in less developed countries may arise or be further developed by internationalisation, mergers and acquisitions, joint ventures and strategic alliances of Western cooperatives. These spin-offs of course require that it is a win-win situation, where both parties obtain benefits and where there is equal cooperation.
- Experiences from cooperatives, both positive and negative, in the Western world can to some extent be applied in the rest of the world. They can be used as an example of cooperatives providing market access, ensuring better negotiating positions and giving farmers a fair share of earnings from processing further downstream. However, the cooperative model must be adapted to the specific circumstances in individual countries, although, in some cases, the differences may be too great. For example, in developing countries, farmer cooperatives are often also used as a tool to fight poverty and ensure food security, which is rarely the case in developed countries.

Conclusion

Cooperatives have a number of advantages and disadvantages in relation to capital owned companies. This means that cooperatives are not superior in all respects, and the net advantages depend on the specific situations and market conditions.

A number of driving forces behind the formation and development of cooperatives can be identified. The drivers can thus be both internal and external in relation to

the cooperatives: The cooperative structure in itself can be more or less advantageous in the individual cases. In addition, a number of external factors such as competition, market power and legislation can be key drivers or barriers to the establishment and development of cooperatives.

In Denmark, the first farmer owned cooperatives were established in the 1880s. A study of the long-term development of the farmer owned cooperative industry in Denmark identifies some of the basic drivers, impacts and conditions that have shaped the development. The overall aim was to ensure farmers' market power and market access in the marketing chain through the establishment of cooperatives in most agricultural sectors, both up-stream and down-stream. Most cooperatives were established in a bottom-up process driven by the farmers.

Since the early beginning, cooperative ownership in the agri and food industry has been increasing. In major industries, the market shares of cooperatives are large and dominant. However, the significance and market shares of cooperatives has developed very differently from industry to industry, indicating that also the success and the need for cooperatives are different.

The development of the industrial structure among Danish agri and food cooperatives has been very rapid. Recent decades have been characterised by consolidation, mergers, acquisitions and internationalisation, which have resulted in just a few, very large cooperatives now being some of the largest in the world.

The international competitiveness of Danish agri and food business is reflected in the fact that their world market shares are remarkably high. Despite the fact that resources in Danish agriculture are rather limited, the industry plays an important role on the global market, as export, in several cases, has a high share of total international trade and is even dominant in some important cases.

The internationalisation of the cooperatives started already in the late 1800s with significant export to especially the UK. Subsequently, export shares rose in most sectors and new distant export markets were also developed. Recently, foreign direct investment, global strategic alliances and production abroad have also been major elements in the globalisation process.

The internationalisation and consolidation phase of recent decades has required financial resources. In general, equity is relatively low in cooperatives as the members are obliged to deliver their products to the cooperative and the economic solidarity among the members reduces the need for financial buffers in the companies. Still, the equity capital in the 28 largest cooperative companies now amounts to almost USD 0,6 million, on average, per full-time farm in Denmark.

Cooperatives are often financially stable companies, and they rarely encounter such serious financial problems that they end up with bankruptcy or loss to creditors. Profits in cooperatives are more constant than in other companies, as cooperatives very rarely have negative financial results.

The employment in cooperatives is increasing, while the number of full-time farms is declining. In 2018, there was an average of 6 employees in the cooperatives per year full-time farm.

In Denmark, the cooperatives account for more than 50 per cent of the turnover in the Danish agri and food industry, and in recent years the market shares have been increasing. The growth and increasing market shares can be explained by several factors including indirect growth generators in cooperatives.

To a large extent, the results from the Danish farmer cooperatives in terms of market access, bargaining power, vertical integration etc. meet the needs of farmers in many less developed countries. However, a number of barriers are identified, and the cooperative model must be adapted to the specific circumstances in the individual countries. It is rarely possible to directly transfer experience from, for example, Danish cooperatives to countries with a less developed cooperative industry. There are also often a number of economic, cultural and organisational barriers that need to be solved.

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