CORA Cork Open Research Archive
Cartlann Taighde Oscailte Chorcaí

Title	Competition between organisational forms in Danish and Irish dairying around the turn of the twentieth century
Authors	McLaughlin, Eoin;Sharp, Paul
Publication date	2019-04-04
Original Citation	McLaughlin, E. and Sharp, P.(2019) 'Competition between organisational forms in Danish and Irish dairying around the turn of the twentieth century', Business History, 63(2), pp.314-341. https://doi.org/10.1080/00076791.2019.1575366
Type of publication	Article (peer-reviewed)
Link to publisher's version	https://www.tandfonline.com/doi/full/10.1080/00076791.2019.1575366 - 10.1080/00076791.2019.1575366
Rights	© 2019, Informa UK Limited, trading as Taylor & Francis Group. This is the Accepted Manuscript of an article published by Taylor & Francis in Business History on 4 April 2019, available online: https://doi.org/10.1080/00076791.2019.1575366
Download date	2026-11-06 06:55:33
Item downloaded from	https://hdl.handle.net/10468/7847

UCC
University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

Competition Between Organisational Forms in Danish and Irish Dairying Around the Turn of the Twentieth Century

Abstract: By 1914, Danish butter had captured a sizeable share of the British market, largely at the expense of Irish suppliers. This is usually attributed to a more successful adoption of the cooperative organisational form, where cultural and legal issues put the Irish at a disadvantage. We argue that there were also significant differences in the private sector in the two countries, where large incumbent proprietary creameries in Ireland were in a stronger position to defend their interests. Even if the cooperatives were able to operate like their Danish counterparts, they would still have faced much tougher competition from proprietary incumbents.

Keywords: Cooperation, corporate structure, Denmark, joint-stock company, dairying, Ireland, organisational form

JEL codes: L22, L23, L66, N53, N54, Q12

1. Introduction

The success of Danish dairying at the end of the nineteenth century falls into a conveniently simple narrative. The combination of a new technology, the automatic cream separator, and a novel institution, the cooperative creamery, brought about a tremendous expansion of butter production as well as improvements in quality, and the capture of over 35 per cent of the important British butter market before the First World War from less than one per cent a couple of decades earlier (Henriksen et al., 2011). Cooperation allowed small producers to take advantage of the economies of scale which could be achieved using the new technology. The Irish story by contrast appears to present a mirror image. Butter exports to Britain were stagnant

over the same period, and there were constant concerns about quality, at the same time as cooperation struggled to take hold.[1] At the heart of these narratives are the perceived merits of different organisational forms: cooperative and private (contemporaneously referred to as proprietary).[2] Today, it is generally accepted that the primary distinction between these regards who owned the enterprise: cooperatives are collectively owned by the suppliers of milk (effectively labour-owned), whereas private (proprietary) enterprises are owned by the suppliers of capital (investor-owned). In the nineteenth century, however, as we will demonstrate for the case of both Ireland and Denmark, the distinction is somewhat blurred. For example, cooperatives in Ireland incorporated as public companies, and early proprietary (so-called 'community') creameries in Denmark were often owned by the suppliers of the milk.

This distinction between cooperative and proprietary is of more than purely academic interest, since there has been a tendency (including by contemporaries) to see the Irish relative decline as a result of a failure to introduce the cooperative organisational form as effectively as in Denmark. Thus, O'Rourke (2007) places this at the centre of his argument, demonstrating that this inability to cooperate was due to unrest and poor social capital in a heterogeneous population which contrasted with Denmark's striking homogeneity. In earlier work, we have made the point that this was reinforced and perhaps in part exacerbated in Ireland by legal and institutional failings, in particular a failure to enforce binding vertical contracts – essentially contracts guaranteeing milk supplies - which are important for the successful operation and economic viability of cooperatives (Henriksen et al. 2015b). By securing a regular supply of milk, such a 'binding rule' ensured that the future profitability of a creamery could be safeguarded, since the exit of members, by decreasing profits and increasing liability (Danish cooperatives and early proprietary creameries were unlimited liability), might lead to a wave of exits, potentially threatening the survival of the creamery (Henriksen et al., 2012). This in itself made the relative success of cooperatives less likely, and in fact Henriksen et al. argue

that the Danish and Irish cooperatives cannot even be considered functionally equivalent, given the absence of the 'fundamental' binding rule in the latter (Henriksen et al., 2015b).

We build on this in the present work, emphasising a point that has been ignored by the literature so far: the role of alternative and competing organisational forms. It is well-known that there were incumbent proprietary creameries in both countries before the first Danish cooperative in 1882, and the first Irish in 1889. However, it is generally understood (see for example Henriksen 1993) that these were effectively outcompeted in Denmark, ensuring that the cooperative sector had a sufficient supply of milk to enjoy the economies of scale from the separator, which required the input of around three to four hundred cows to work efficiently. This was not the case in Ireland, where cow densities were already smaller. Proprietary creameries operated alongside cooperative creameries in Ireland over the duration of this study. This paper therefore examines why the corporate form proved more durable in Ireland relative to Denmark.

The focus of the present work is thus specifically on non-cooperative organisations and the challenge they presented to cooperatives, and in this way we provide another reason why the cooperative organisational form was predominant in Denmark while Ireland had more private creameries. This emphasis on private creameries is especially important in the case of Ireland where the historiography is dominated by the study of cooperatives (e.g. Bolger 1977, Doyle 2014, Moulton 2017), yet over the period 1880 to 1920 roughly half the creameries on the island were privately owned. We use new information from company registration and dissolved company archives and ask when private companies were formed, where they were located, who their shareholders were, and how big the companies were. We demonstrate that the proprietary sectors in the two countries were strikingly different. The Danish proprietary creameries were either traditional landed estates with little opportunity to expand, or small-scale, recently

established *fællesmejerier* or 'community creameries', which can be seen as precursors to the cooperatives (and in fact many soon converted to this organisational form). The Irish proprietary sector, on the other hand, was large, established (by the time of the first cooperative), and moreover not only producing butter but for example also condensed milk.[3] In fact the cooperatives never successfully outcompeted the larger incumbent creameries in Ireland, with the final triumph of cooperation only coming after the rationalisation and legally enforced cooperation imposed on the sector after independence (Henriksen et al., 2015b). This lends support to Bonus's argument that private dairies may be superior to cooperative dairies if the former can build a positive reputation amongst milk suppliers, and in contrast, cooperatives can thrive when members have trust in the cooperative association and identify with its goals and means (Bonus, 1986). These findings lead us to conclude that not only were private creameries in Ireland not clearly an inferior organisational form to cooperatives due to the lack of the binding rule in the latter, but they were also a very different challenge to the emergence of cooperation than that faced in Denmark.[4] This of course leads to a different question: if the incumbent Danish private creameries had been stronger, or their Irish equivalents weaker, might cooperatives have thrived in Ireland relative to Denmark? Attempting to resolve such a counterfactual scenario is, however, beyond the scope of this study.

The goal of this paper is therefore to understand what factors influenced the choice of organisational form in the dairy industries of both countries, where both corporation and cooperation emerged, and why proprietary enterprises fared so much better in Ireland than in Denmark. There is a substantial literature on organisational choice about what happens when different forms of organisation are competing, which at its most fundamental level invokes the choices of firm owners. Conventionally speaking, the 'owners' of a 'firm' have two formal rights: the right to control the firm and the right to appropriate the firm's residual earnings.

Drawing from the paradigm of Hansmann (1988, 1996, 2013), firms can be seen as owned by their patrons, i.e. agents who have a contractual relationship with the firm. In the case of producer and consumer cooperatives, the owners are either the suppliers of inputs or the purchasers of supplies, or, in terms of investor-owned firms, they might be the owners of capital. Thus, whether the organisational form adopted is investor- or producer-owned in the case of dairying in Ireland and Denmark may depend on the minimisation of costs of ownership (transaction costs) and of management (agency costs). Seen in this way, the choice of organisational form will depend on various transaction costs involved in operating a creamery, primarily relating to milk supplies and capital costs, as well as the costs of monitoring managers.

This ties into and shed light on an old literature from industrial organisation on the value of incumbency, and why (identical) firms that are equally efficient might be excluded from a market. A key result of the theoretical work is that encouraging entry is not necessarily welfare enhancing (Gilbert, 1989). In the present case, however, we explore ownership forms which are very different and impacted on the performance of the firms themselves. The economics literature thus also explains that there is a diverse array of organisational forms and that this diversity is suited to different environments and types of innovation. Teece (1996) outlines key aspects of how firms adapt to technological innovation through the establishment of new organisational forms. In the period we study, the primary technological innovation was the centrifugal separator which, from the late 1870s, enabled a more rapid and effective separation of cream from milk. Effectively this innovation implied the transition from traditional to modern methods of production. This involved changes in firm (farmer) organisation and thus required the adoption of new organisational forms: corporation or cooperation.

The issue of the choice of organisational form is not just idiosyncratic to the dairy industry but is also addressed in the wider business history literature. Guinnane et al. (2007) focus on the choice of organisational form and question the conventional view that the joint-stock corporation as an organisational form was such an important factor in modern economic growth. They show that when an alternative organisational form – private limited companies – were available (in Britain, France and Germany, but not until much later in the US) these were adopted en masse as they were more suited to the needs of small and medium-sized enterprises compared to the more cumbersome public limited liability company. Elsewhere, in a study of the organisational forms involved in the Anglo-Indian tea-trade, where firms faced the need to both access large amounts of capital and also to monitor distant staff, Aldous (2015) explores why entrepreneurs did not choose the joint-stock form and, by not doing so, if they had made a mistake. Aldous (2015) argues that although the stand-alone joint-stock form was successfully able to raise capital from a wide-range of investors, its governance structure meant that it faced high agency costs, whilst partnerships found it difficult to raise capital but were more effective at monitoring and incentivising staff. Aldous shows that a hybrid organisational form – the evolution of trading partners into managing agents – was an effective solution to the dual problem of obtaining capital and reducing agency costs in the Anglo-Indian tea trade, and thus essentially showing that entrepreneurs were innovative, adaptive and successful in their use of organisational forms. Likewise, we find that in both Denmark and Ireland, farmers were innovative and adaptive in their use of organisation forms and developed structures that suited their needs. In a similar vein, Wadhwani (2011), in a study of the organisational forms adopted by US savings banks, argues that conventional economic and financial theories which emphasise transaction cost advantages and information advantages only partly explain why nonprofits and mutuals had competitive advantages over rival organisational forms. Instead, he finds that the success of non-corporate organisational forms was in part due to innovation

advantages but also to legal, regulatory and political legitimacy. These studies provide insight for this study in terms of why different organisational forms might co-exist and why certain types of organisational forms are more prevalent in different contexts. In the case of the later cooperatisation of the dairy industry, we note particularly Wadhwani (2011)'s observation that the legal, regulatory and political legitimacy are key to understanding this development.

Finally, this also links with the findings by sociologists of the importance of social movements: social movements can promote certain organisational forms over others and do so effectively by mobilising public opinion and failing to provide information on alternatives (Rao et al., 2000; Schneiberg et al., 2008). In the Irish case, the Irish Agricultural Organisation Society was particularly active in promoting the cooperative organisational form at the expense of others. However, as Schneiberg et al. (2008) note, the development of cooperative organisational forms can also face hostile environments if faced with organised corporate entities, leading to contestation of the industry along organisational lines. The resultant potential for conflict led Rao et al. (2000, p. 274) to argue that 'new norms, values and ideologies are infused into social structures via political contestation'. This was very apparent in the Irish story, as described by Henriksen et al. (2015a, 2015b), but less so in Denmark, although there too a powerful cooperative movement emerged.

The rest of this paper proceeds as follows: the next section discusses the proprietary creamery sector in Denmark and Section 3 describes in detail the Irish equivalent. Section 4 relates our findings to the debate about the Irish relative failure to cooperate, and Section 5 discusses the forced cooperatisation of the Irish dairy sector after partition. Section 6 concludes.

2. The Danish 'community creameries'

The origins of modern dairying in Denmark can be traced to developments on traditional landed estates from the late eighteenth and early nineteenth century when new organisational

forms and practices spread from the Danish duchy of Holstein (Lampe and Sharp 2018).[5] Danish estate butter established a reputation for itself on the British market, but the vast majority of butter was still of poor quality, produced by peasants, largely for local consumption. As the opportunities represented by exports to the expanding and urbanising British market became obvious, however, merchants and others saw the benefits of increasing the supply of butter for export by encouraging larger, homogeneous quantities from the vast majority of dairy producers who were outside the estate farms (Lampe and Sharp, 2014). Thus, from the 1860s, a new type of creamery emerged, the so-called *fællesmejeri* or 'community creamery'. The idea of processing peasant-produced milk in a central location had been around since at least the eighteenth century in the form of the Swiss *fruitieres* (Henriksen et al., 2015a), and a number of such creameries are known to have been operating in Denmark by the beginning of the 1860s (Bjørn, 1977, p. 66). The big take-off was however in the 1870s, and after the middle of that decade, they were widely spread on the islands of Funen and Zealand, although they enjoyed less success in Jutland. Nevertheless, by 1880, community creameries were an established part of the Danish dairy industry, helped particularly by the introduction of the automatic cream separator, which processed the milk for butter production more efficiently, but required a large supply (Bjørn, 1977, p. 67).

During the early 1880s, community creameries expanded further, and societies were formed to support the industry (Bjørn, 1977, p. 68). Meanwhile, however, what is generally considered to be the first Danish cooperative creamery was formed in Hjedding in 1882, perhaps not coincidentally in Jutland, that is the part of the country in which community creameries had not become widespread. By the end of the decade, well over one thousand such cooperatives were to spring up over the whole of Denmark. Table 1 illustrates this and it is also displayed quite vividly in Map 1.

[insert Table 1 here]

[insert Map 1 here]

Central to our argument is the idea that the proprietary sector in Denmark was very different to that in Ireland. In Denmark, proprietary creameries were termed community creameries, but these included a wide range of different organisational forms.[6] In an address to leading farmers in 1885, the estate manager N.P.J. Buus (1886) divided them into three categories:

> '1. Community creameries with agriculture, where individual men, who have usually run a creamery before, expand their premises and equipment, and thereafter purchase milk from their neighbours, and process it together with their farm's own milk at the expense of the buyer.
>
> '2. Community creameries without agriculture, namely those where an experienced dairyman buys a plot of land, builds a creamery, buys milk from the neighbourhood, and processes it at his own expense.
>
> '3. Public creameries, which are also without agriculture; the owner is not a single man, but a partnership consisting of many or a few participants, who at their own expense build a creamery on new soil, deliver their milk to it, but also buy up other milk from others and process it at the expense of the partnership.' (Buus, 1886, p. 1 [own translation]).

The first category consisted of a small number of large estates, and many small estates and medium sized farms with around 25 to 75 cows, as well as smaller farms, although these were typically very small scale. These types of creameries were spread over the whole country. The second category was on the other hand concentrated in the traditional dairying regions of Copenhagen County, the islands of Funen, Lolland, and Falster, as well as parts of north-

western Jutland. These typically processed the supply of milk from around 150 to 400 cows, and most were financed, established and run by the same man. Only very rarely did they reach a large scale, such as when the merchants Busck in Copenhagen, and Schou in Slagelse opened the large Slagelse creamery in 1875 for the production of butter in tins, which Busck's firm exported (Bjørn, 1977, p. 75). Many of these creameries even before the cooperatives emerged were having difficulties due to the limited supply of milk, and since the risk usually fell entirely on the dairyman, it became common for more than one person to work together in financing the initiative. Thus, there was a link between Buus' second and third categories (Bjørn, 1977, p. 76).

The vast majority were however from the first two categories (Bjørn, 1977, p. 74), which means they were very different from the large industrial scale enterprises present in Ireland, as we will discuss below. In fact, Bjørn (1977) concludes that the Danish community creameries represented merely a 'phase in the development of the Danish dairy industry', but that they were an important step on the way from the tradition of dairying at home to technologically advanced, large scale initiatives. Moreover, he argues that one reason why the cooperatives could spread so rapidly from the 1880s was because of the experience they took from earlier attempts at the centralised processing of milk. As he demonstrates, the dividing line between cooperatives and community creameries is somewhat blurred.

The experience of Kaslunde Creamery in West Funen serves to illustrate this. It was founded in 1875 by a young farmer, Han Christensen. He formed a partnership with eight medium sized farmers in the neighbourhood, writing a contract which specified capital and management conditions, as well as rules for how the milk was to be delivered, paid for, etc. It also stated that

> '§5: Any profits or losses should be shared, after all operating costs are accounted for, such that each participates in relation to the amount he has delivered.'

This led some to conclude that Kaslunde was the first cooperative (Bjørn, 1982, pp 44-45).[7]

Between 1901 and 1902 the dairy journal *Mælkeritidende* hosted a lively debate as to whether Kaslunde or the aforementioned Hjedding was the first cooperative creamery in Denmark. The conclusion reached by the editors was that

> '1. Kaslunde Creamery was the first in Denmark which was managed and the milk suppliers were paid according to cooperative principles.
>
> '2. Hjedding Creamery, which was founded in 1882, seven years after Kaslunde Creamery and without any knowledge at all of the latter, was the first creamery which was imitated, and the present history of the cooperative creameries starts undoubtedly on the 10th of July 1882, when Stilling Andersen established Hjedding Creamery.'[8]

Despite not today being considered the origin of the subsequent cooperative boom, Kaslunde did in its time have an impact in Funen, where the initial spread of creameries in 1883-84 were modelled on Kaslunde, rather than the cooperatives, although with the addition of a binding clause (Bjørn, 1982, p.45), thus further blurring the line between cooperatives and community creameries. Kaslunde was therefore another step on the way to the cooperative creameries, which would take off only from the 1880s with the spread of the automatic cream centrifuge.

As Henriksen and others have argued, the cooperative form emerged because creameries run in this way were better able to ensure quality, enjoyed supply from a larger area[9] allowing them to use the centrifuge more efficiently, and 'funds for expansion were harder to obtain for the individual owner' (Henriksen, 1993, p.173). This latter suggests some sort of capital market imperfection, since it could have been solved by incorporation, and this idea is in fact supported

by Hansen, who estimates that seventy per cent of total investments in Danish agriculture between 1900 and 1914 were financed out of retained profits (Hansen 1972, p. 283).

Beyond the literature surveyed above, we can more fully investigate the distinction between the community creameries and the cooperatives through a number of sources we have at our disposal. The best turns out to be newspapers, since very few archival records have survived. This in itself contrasts strongly with the Irish case, which we discuss in the following section, and reflects one of our main points: that the proprietary creamery sector in Denmark was very small.[10] Starting with the archives, we found just nine records in the Danish National Archives from the relevant period, contrasting with literally hundreds of records from the cooperatives (unlike their Irish counterparts, Danish cooperatives and community creameries were not required to register anywhere, since they were founded under the article of the Danish constitution which guarantees freedom of association). Most of these comprised random records of various types including some accounts.[11] One provided, however, a contract, dated 7 January 1880[12], written for a tenant, to be employed for a period of three years, as part of the establishment of a community creamery 'Albion', which became a cooperative in 1888 (Ellbrecht, 1916, p. 460). The contract contains sixteen paragraphs, and has much in common with those that were written for dairy tenants on the *hollænderier* (central dairies) of the large landed estates, a multitude of examples of which can be found in the archives (see: Lampe and Sharp, 2018, pp 69-70). Thus, it stipulates the rights (in terms of for example housing and equipment) and duties (reparation, providing other equipment) of the tenant. The contract states that the creamery was established by a society, whose members were obliged to supply all their milk, beyond what they wished to consume themselves, and the tenant was to collect it from them (and was not allowed to collect from others). It stipulates clear rules for how the milk was to be paid for, based on the butter price. A number of rules were stipulated for the members, for example in terms of how to feed the cows, and in terms of hygiene. It is signed by nine men

(presumably the board of the society), as well as the tenant, Niels Pedersen. This contract is interesting in that it illustrates clearly the way in which practices established on the estates were transferred to the smaller farmers. Also, if we consider a cooperative creamery to be an organisation owned by the farmers, and perhaps with the 'fundamental' binding rule, then this is not so very different. The contract for the first cooperative from 1882, Hjedding, is available online,[13] and is far more sophisticated and is a contract between the members rather than between them and a tenant, but many of the same ideas are present. Another, inspired by Hjedding but going into even more detail about for example feeding, hygiene and general practice at the creamery, from Strelluf in 1883, is also available online.[14]

The lack of archival records motivates the use of another source, the database of Danish newspapers maintained by the State and University Library in Aarhus, Denmark,[15] which covers millions of pages of Danish newspapers from the eighteenth century until today. We searched for articles relating to community creameries,[16] with the oldest mention we could find in an article from 1863. Many of the articles were advertising for employees including tenants, or landowners announcing they had land available for building one, or announcing meetings for local farmers to sign contracts for establishing one. Not too infrequently, there are also reports of them burning down. The most fascinating articles are those describing the operation of the community creameries, however. Bjørn's aforementioned point about the community creameries being an evolutionary precursor to the cooperatives is extremely clear.

For example, *Ribe Stifts-Tidende* reported on 8 October 1863[17] the founding of a community creamery in Sæby (in northern Jutland, close to Frederikshavn), based on an earlier precedent from Jordrup parish (around 250km away, close to Kolding). Most of the farmers in the parish got together to share the expenses of building the creamery, and shares were distributed according to farm and herd size. A committee of five men was appointed to manage it and it processed the milk of 150 cows, producing butter and cheese. Another example, in a

report in *Jyllandsposten*, dated 29 July 1877[18] reported on a community creamery, 'Godthaab' (Good Hope) established on the island of Thyholm, in the northwest of Jutland. It moved into new buildings and became a cooperative in 1898 (Ellbrecht, 1917, p. 302), but again, this seems to have been more of an evolutionary transformation. It is reported that an agreement was reached in the spring of 1876 between dairy assistant G. Nielsen and nine farmers to set up a community creamery. They built a building which was leased for eight years from 1 November 1876, with an obligation to collect milk twice per day, pay interest on the debt for building it at 8 per cent, and pay for the milk every other month. All aspects of care, cleanliness, and milk times were determined. Similar reports can be found for other locations and years.[19]

From the late 1870s we found a number of reports of meetings and discussions about the viability and desirability of community creameries. Of particular note is an article from *Fyens Stiftstidende* from 7 February 1877[20], reporting on a debate held at a dairy exhibition in Odense on 5 January 1877. A dairy assistant named Hansen is reported to have argued strongly in favour of community creameries, and that these should be run by a professional manager and owned by the suppliers, since they were interested in the greatest return, and any issues with for example guaranteeing good hygiene could be taken care of with clear rules. He believed this to be superior to a community creamery owned by one man who should purchase the milk, thus illustrating the blurry distinction between supplier-owned and capitalist-owned creameries in the minds of experts at that time.

We found many more articles discussing the merits of community creameries versus estate production in the late 1870s.[21] Lectures and debates all over the country discussed alternative ways a community creamery might be organised, i.e. by the farmers, or a professional manager or dairyman, although the biggest obstacle to their spread before the invention of the centrifuge seems to have been the issue of how to organise the transport of milk to the creamery[22], which was also one of the main bones of contention for the early cooperatives (Henriksen et al., 2012).

Another issue was how to pay for the milk, and how to guarantee a good quality of the milk supplied.[23] A particularly interesting example reports on a report written by Fyens Stifts Patriotiske Selskab (the Patriotic Society of the Diocese of Funen) in Odense[24] which discussed the advantages and disadvantages of community creameries. This article discusses their origin in Switzerland, and how they then spread to the US, making cheese, and had been discussed in Denmark twenty years ago. The Society itself had tried to start one in Marslev, but without a good result. In Sweden, Norway and Finland 'Bolagsmælkerier' (community creameries) making butter had had some success since the introduction of a cooling system to replace the traditional *bøtte* system[25], but they had not spread too widely due to difficulties with transport. Again, it is argued that community creameries should usually be owned by the farmers rather than single man. The problems with transport were however solved with the arrival of the centrifuge, and despite some debate and even opposition from estate owners and the agricultural societies due to concerns about increased supply and thus lower prices[26], the system of supplier-owned creameries using centrifuges took off rapidly from this date.

Nevertheless, it is not until an article in *Horsens Folkeblad* from 28 February 1884 that we find the first mention of the word 'andelsmejeri' (cooperative creamery). This change in usage is even discussed in an article by a teacher, A. Jørgensen, writing in *Middelfart Avis*, who calculates the return on a cow from different types of creameries (private, community, or cooperative – with the latter giving the highest return), and states that it is important to make this distinction since the cooperatives were no longer called community creameries. At this point conflicts between the rival organisational forms are noted, including the issue of establishing rival community and cooperative creameries close to each other (as in Ireland, see below).[27] A letter to the editor of *Fredericia Dagblad* published on 14 April 1885 from 'C.S.' (possibly the important dairy consultant Christian Sonne) even makes the point that the community creameries and cooperatives were often confused in the debate, and in fact the only

difference was that community creameries paid a fixed price, whereas cooperatives gave a return to their members at the end of the year, which might be less, motivating his argument against cooperation.[28]

The debate between community creameries and cooperatives became more vocal from the middle of the 1880s. Elsewhere, suppliers often bought out community creameries, allowing the previous owner to continue as manager. As Table 1 illustrates, the creameries styling themselves 'cooperatives' outcompeted those styling themselves 'community creameries', with the distinction becomes less blurred over time. Thus, after 1890, the community creameries were either older operators who had managed to survive the cooperative onslaught, or newly established private creameries, often close to the cities and mostly supplying fresh milk rather than butter. But as Bjørn describes it 'the cooperative creamery movement in 1887-88 experienced the … breakthrough, that alongside all economic arguments and reasonings had the character of an all-embracing wave that washed over the country. To establish a cooperative creamery was in these years equivalent to taking part in the progress, and to participate in the development. It soon became the norm to participate in a cooperative creamery – while it became abnormal to deliver the milk to a private creamery' (Bjørn, 1982, pp 81-82 [our translation]). He gives an example of a community creamery which converted to a cooperative with the previous owner becoming the manager, where the stated reason was not because of any discontent with the way in which he had run the creamery, but rather that the suppliers 'quite simply *had* to have a cooperative' (Bjørn, 1982, p. 82 [our translation]).

In conclusion, the idea of centralising the production of peasant butter emerged in Denmark by the early 1860s, and by 1879, three years before the 'official' first cooperative, the sector was so well developed that an Irish commission travelled to Denmark in that year to see what they could learn.[29] But as will become clear from the next section, the community creameries were nothing like the large dairy firms found in Ireland at that time. The incumbent dairy

producers in Denmark before the first cooperative in 1882 were either traditional estates or small-scale and under-capitalised community creameries. Moreover, these latter often had much in common with the cooperative creameries for which they can be considered a sort of evolutionary precursor. Indeed, they often converted to true cooperatives once the advantages of this form became obvious. The contrast with the proprietary creameries in Ireland could not be starker.

3. Mapping the proprietary and cooperative creameries in Ireland

Ireland, unlike Denmark, had a long tradition of commercial dairying for export that pre-dated the advent of the modern factory/creamery system typified by the use of centrifugal separators. Dairying was historically located in the south-west of the island in the province of Munster. Butter was a traditional export commodity, especially for the provisions trade in the eighteenth century, and centred on the port of Cork where the Cork butter market was formed in 1770 (Rynne, 1998). From the 1840s, Irish butter mostly went to Britain and exports rose steadily (Solar, 1990), although it gradually lost market share, as the British market expanded, to competition from France and the Netherlands in particular and there was a reorientation towards the export of live cattle before the 1880s,[30] when even more substantial competition emerged from Scandinavia as well as the cheap substitute product, margarine (Donnelly, 1975; Lampe and Sharp, 2015). Thus, on the eve of cooperation, the Irish butter industry already stood in a weakened state compared to its former glory, although the invention of the automatic cream separator led to something of a renaissance. As noted by O'Rourke (2007), much of the emergent modern Irish butter industry was in the hands of private enterprises rather than cooperatives, the first of which was founded in 1889.

Before we can explain why there was this contrast with the Danish experience, we must first know more about these firms and important sources to help answer these questions are the

records of dissolved companies.[31] Under UK company law (and very much unlike in Denmark), companies registered in Ireland were required to submit annual shareholder returns to the Dublin office of the Registrar of Companies. Unfortunately, original company records were destroyed by a fire in the Custom House in 1921 during the Irish War of Independence. However, following the destruction of the original material all companies were required to re-submit their details.[32] Furthermore, our task is somewhat simplified by the political economy surrounding the industry which became nationalised in the 1920s.[33]

A list of dissolved companies reconstituted after 1924 are held in the National Archives of Ireland. We searched this list for companies with the words 'butter', 'creamery' and 'dairy'. From this search we found 23 companies reconstituted in the 1920s, although a small number of these were wholesalers or general producers and not creameries *per se*. The records found were of varying consistency, but the majority contained valuable information regarding shareholder name, address, occupation and value of shareholding, and in addition a number also contained memorandums of association and articles of association. The records also contain information on what happened to the creameries upon dissolution. The records consulted, summarised in Table A1, contain not only the largest indigenous 'creamery', the Condensed Milk company of Ireland, or Cleeve's as it is more commonly known, but also a number of smaller companies, as well as those that later voluntarily converted into industrial and provident societies (i.e. cooperatives).

Cleeve's, registered on 18 June 1889, had a share capital of £350,000 and 38 recognised shareholders. These shareholders varied and included family members. Its full name also gives an insight into the functions of the company, which predominantly produced condensed milk and canning (Bielenberg, 2009 , pp 74-75). In fact, Cleeve's was one of the largest suppliers of condensed milk in the UK and during the First World War had a large purchasing contract from the British army. The fate of Cleeve's following the end of the War[34] and the foundation

of the Free State is also evident as the company was re-organised and its capital reduced. Some of its branches were also sold to other private concerns. The other large creameries we found were the Newmarket Dairy Company and the Golden Vein dairy company. Again, these were highly capitalised companies with a small number of shareholders, but the smaller companies with a smaller share capital are also of interest. These were localised companies whose shareholders were predominantly local farmers and others in the surrounding area, and thus had more in common with some of the Danish community creameries.

In addition to this dataset on dissolved companies, we were also able to track the incorporation of joint-stock creameries.[35] Although private family enterprises were difficult to trace using this source, the major private creameries of this period, including the Condensed Milk Company of Ireland (Cleeve's), are included in our dataset. Many of the large joint-stock creameries opened branches and these were predominantly located in the south-west of the island in the province of Munster.[36]

As well as the incorporation data, we have also cross-referenced this with a list of all creameries from Porter (n.d./1909 British Library) that were in operation c. 1908. Porter's list demonstrates the importance of the Manchester based Co-operative Wholesale Society and the Scottish Co-operative Wholesale Society in operating creameries.[37] It also highlights the role of large joint stock companies that operated subsidiary networks. These included the Maypole Dairy Company, headquartered in London, The Newmarket Dairy Company (Cork), the Cork and Kerry Creamery (Cork), J. J. Lonsdale & Co. (Liverpool), the Golden Vale Dairy Company, Cleeve Brothers (Limerick), and the North Kerry Creamery Company. Combined these firms accounted for 57 per cent of non-cooperative creameries on Porter's list. Of these, 83 per cent were located in Munster and less than one per cent were located in Ulster. Of the remaining non-cooperative creameries, 79 per cent were located in Munster whereas 13 per cent were located in Ulster. It is clear that private creameries chose to locate in the area most

suitable to dairying, i.e. Munster. This is clearly shown in Map 2, which illustrates the location of all creameries on the island. The heartland of Munster was an area known as the Golden Vale or Golden Vein (clearly visible in Map 2 as a cluster of both proprietary and cooperative creameries), consisting of rolling pastureland which was exceedingly good for dairy farming and included the traditional centre of the butter trade, Cork.[38] Also note the difference in the spatial concentration between creameries in Ireland and Denmark. Munster, the south-west of Ireland, comes closest to resembling the Danish spatial pattern.

[insert Map 2 here]

Also marked on Map 2 are so-called 'auxiliaries'. Porter states that these were separation stations where cream was extracted from the milk by centrifugal machinery and then forwarded to a 'central' where it was manufactured into butter. Centrals are defined as creameries which not only separate the cream from the milk but also manufacture it into butter. Porter includes a total of 644 creameries which are listed by county with organisational form and whether or not they were central or auxiliaries. Of the 644, 315 are private and 329 are cooperative with a similar number of auxiliary creameries in both cases: 53 per cent of privates and 48 per cent of the cooperatives. Moreover, the larger private creameries, such as Cleeve's, had a greater ratio of auxiliaries to central creameries than the cooperatives: a ratio of 4.4 auxiliaries to centrals for Cleeve's versus 1.06 for cooperatives. The large private firms with headquarters located in Britain (the Cooperative Wholesale Society (CWS), Scottish CWS, the Maypole Dairy Company, and J. J. Lonsdale) also had higher ratios of auxiliaries to centrals: 1.24, 7, 1.50, and 9.5 respectively. Thus, the private creameries were not only different in terms of ownership form but also in terms of their organisational structure.

In addition to the private butter production, liquid milk was also privately organised and, in common with the rest of the UK and Denmark, located in areas surrounding the major urban centres (Belfast and Dublin) on the island (Taylor, 1976). In East Ulster there was an urban

premium for liquid milk relative to the price received by milk suppliers in rural areas (Baol and McAodha, 1961). The liquid milk market also helps explain the dearth of creameries in and around Dublin since it drew milk supplies from a wide radius (Foley, 1993).

Turning to the cooperatives, since Irish cooperation was heavily influenced by the activities of Horace Plunkett and the Irish Agricultural Organisational Society (IAOS), which was founded to promote cooperation as a means to the development of rural Ireland (Henriksen et al., 2015b), the standard source material for studying cooperation is from their annual reports. These recorded information on the activities of cooperatives which were founded by and registered with the IAOS, but excludes creameries that experienced alternative beginnings such as joint-stock companies operated by farmers, or cooperatives associated with rival institutions. Thus, to overcome the IAOS bias we have complemented this source with UK registers of joint-stock companies and industrial and provident societies, and the list of all creameries published by Porter.

One reason for this multitude of records of cooperatives is that, under UK legislation, they could incorporate under a number of legal acts, and thus are given different descriptions depending on how they registered.[39] The early British consumer cooperatives did so as Friendly Societies and were enabled to do this by the clause that they were engaging in purposes other than those specified in the act provided they were not illegal activities (Gosden, 1973, p. 191). Further developments in cooperative organisation and methodology in the 1840s, especially the payment of dividends on shares, led to the enactment of the Industrial and Provident Societies Act. These Acts diverged from the Friendly Societies Acts and converged with the Company Acts, especially with the granting of limited liability to industrial and provident societies in 1862. There were few restrictions on these societies. For example, cooperative banking, which was prohibited under early legislation, was legalised under the 1876 Industrial and Provident Societies Act. Cooperatives were required to register under the acts, and

statements of the number of societies registered were published in the annual reports of the Chief Registrar of Friendly Societies.

O'Donovan (1940, p. 303) states that there were calls for the formation of cooperatives as early as the 1860s and '70s, but we have traced the first creamery operating as a cooperative to 1880 when the County Waterford Dairies Society (Limited) was formed, although this cooperative had a short existence and was wound up in 1882. The literature attributes the first cooperative to Horace Plunkett and this is corroborated by our data since no other cooperatives were formed until 1889. The IAOS itself was registered as an industrial and provident society in 1894.[40]

Figure 1 thus illustrates that until the 1890s, private creameries were the predominant organisational form, and mostly located in Munster. From the foundation of the IAOS, cooperatives seem to dominate, and they are increasingly located outside of the dairy heartland.

[insert Figure 1 here]

Thus, as Table 2 shows, private creameries were the dominant organisational form in the important dairying region of Munster. In fact, the available data suggests that the private share of creameries in this province was in fact growing. The importance of Munster was recognised by the founding father of Irish cooperation, Horace Plunkett, who records in his memoirs that the strength of the dairy industry there was one of the factors which inspired his early efforts. Plunkett argued however that the existing economic environment 'clearly indicated a need for the application of cooperative effort' to various aspects of agricultural enterprise (production and supply of inputs). The IAOS chose to focus primarily on dairying for two reasons: firstly, that new machinery, 'costly but highly efficient', enabled the production of a standardised product that was more competitive, citing the example of Denmark and Sweden. Secondly, 'to add to the interest of the situation, *capitalists* had seized the material advantages which the abundant supply of Irish milk afforded, and the green pastures of the 'Golden Vein' were

studded with snow white creameries which proclaimed the transfer of this great Irish industry *from the tiller of the soil to the man of commerce*' (Plunkett, 1905, pp 187-188 [emphasis added]).

[insert Table 2 here]

Munster continued to dominate Irish dairying even after the expansion of the cooperatives, and, despite the aforementioned abundance of new cooperatives being founded mostly in Ulster after 1894, butter was still largely produced in Munster. This reflected the fact that the proprietary sector was much larger than the cooperatives. Nothing illustrates this better than the fact that the value of the share capital in Cleeve's alone, at £350,000 in 1923, dwarfed that of the entire cooperative sector. Of 336 societies registered with the IAOS in 1920, the combined share capital was just £193,208 (IAOS Annual Report 1921).[41]

Further evidence to support this observation can be seen in Table A2 which summarises the annual data included in incorporation returns.[42] These include the number of yearly incorporations, the number listed as 'dairy farmers', the number of shareholders and the nominal capital. The largest number of joint-stock creameries were formed in 1886, and curiously all of these were stated to be 'dairy farmers'. The number of formations decreased gradually and by the 1900s there were no creameries formed as limited liability companies but they were instead returned as private companies. For the majority of the 1880s the creameries were formed by 'dairy farmers' and then this changed in the 1890s primarily because the alternative organisational form – cooperation – was being explicitly advocated by the IAOS. The mean capital of all incorporated creameries over the period 1879-1900 was £9,800. However, the largest incorporated creamery in our dataset is Cleeve's, with a nominal share capital of £250,000, and in all there were fifteen with share capital over £10,000. Of these only one was associated with dairy farmers. When the dataset is split between 'dairy farmers' and other proprietary creameries the mean capital is £1,534 for the dairy farmers versus £20,823

for the other proprietaries. Not only were private creameries more heavily capitalised, but they also had fewer shareholders on average: 64 versus 139 in the 'dairy farmer' creameries. Thus overall the evidence from dairy company formations suggests that private creameries were more heavily capitalised than the *de facto* cooperatives.

Thus, an important difference with Denmark was the size and structure of the proprietary sector in Ireland. The fact that the IAOS largely located cooperatives outside of Munster is particularly telling and, as we will argue in the next section, sheds some light on the reasons for what is usually portrayed as the relative failure of Irish cooperation.

4. How and why did Irish cooperation fail?

As Henriksen et al. (2015b) have pointed out, Irish cooperatives failed to emulate the success of their Danish counterparts due to their inability to enforce binding vertical contracts. In this sense Irish cooperation failed. In another sense, they succeeded because a large number of cooperatives were founded, in particular after 1894. Their failure was more a relative failure compared to Denmark, since the proprietary sector remained dominant, at least in the most important dairying region, Munster.

Cooperative creameries came late to Ireland, perhaps in part due to a lack of tradition for agricultural cooperation or rural/sectarian conflict (Henriksen et al., 2015b,; O'Rourke, 2007).[43] When they arrived, they were explicitly inspired by the Scandinavian example, but they faced competition from proprietary creameries – joint stock companies or more traditional private partnerships – which had already been established in the wake of the incentives to centralise production presented by the automatic cream separator. These had largely established themselves in Munster, since this was the main dairy region. The location of the majority of the cooperatives, away from Munster, thus suggests that they found it difficult to

compete with the incumbent creameries, that there was less need for cooperation in areas which already had a functioning private sector, or a combination of the two.

The literature on dairy production in late nineteenth century Europe emphasises the institutional advantage of the cooperative organisational form in reducing transaction costs and agency problems. This is quite evident in the case of Denmark, however less so in Ireland. The aforementioned literature on the difficulty of entry to a market given incumbent operators suggests that path dependency might be a large part of the explanation for the low cooperative share in Munster. A large firm like Cleeve's could undermine cooperative rivals by offering better prices for milk and by supporting legal challenges to the binding rule (Henriksen et al., 2015b). To the advantage of the cooperatives was the support of a powerful social movement in the form of the IAOS. Moreover, there is some evidence for their superior efficiency. We discuss both in the following, but clearly neither was demonstrably sufficient.

As mentioned in the introduction, the sociological literature emphasises the importance of social movements in the adoption of organisational forms (Rao et al., 2000; Schneiberg et al., 2008). In this instance, the IAOS promoted cooperatives as alternatives to corporate organisational forms and did so effectively by mobilising public option and transmitting information. However, the IAOS was a top down promoter of cooperation, and the Irish experience thus contrasted greatly with that of the Danish, where cooperatives were formed by voluntary associations of peasants (Henriksen et al., 2015b, p. 13). This led to the sort of 'political contestation' described by Rao et al. (2000, p. 274). The cooperatives faced opposition from the established proprietary creameries in Munster which were very large, unlike their Danish counterparts, with easy access to the largest capital market in the world – the UK. Moreover, to make matters more difficult, butter traders in the province, fearing for their privileged position, actively undermined cooperatives (Donnelly, 1971).

The IAOS thus quickly understood that the 'need' for cooperation was elsewhere. In 1895 the IAOS had opened one creamery in Ulster, in Glangevlin, County Cavan, but in 1896 although there were by that time six in operation in Ulster, the Glangevlin creamery had already ceased trading. By 1897, however, the IAOS reported that the 'remarkable feature in the growth of the movement has been its extension in the north and north-west'– creameries which it was responsible for founding (IAOS Annual Report 1897, p. 4). Moreover, the IAOS was even involved in actively closing creameries established on marginal land, since it believed that the available dairy land was reaching saturation point.[44] From 1906 the cooperative share increased, as the IAOS continued to lobby private creameries to transfer ownership to cooperatives. In 1909, after years of losses, the Cooperative Wholesale Society (CWS) agreed to sell its creameries in Ireland and gave the IAOS first preference on sales (O'Donovan, 1940, p. 324).[45] This was an ironic turn of events as the first creamery opened by the CWS was in fact a take-over of a failing producer cooperative in Castlemahon (Limerick) (Wilson et al. 2013, pp 128-129).[46]

The work of the IAOS by no means met with universal acclaim from farmers, however, who could not understand the fixation on butter production. At the 1897 AGM of the IAOS a delegate from Ennistymon, County Clare questioned this 'as there were some parts of the country where there was hardly any dairying' (IAOS, Annual Report 1897, p. 55). The delegate also 'considered it was a mistake to start a dairy society at Kilfenora [County Clare]. If the Society [IAOS] had dealt with the question of fattening cattle and sheep there it would be better. The Society, he thought, would command more general support if they went into matters of that description, instead of giving so much importance to dairying' (IAOS, Annual Report 1897, p. 55). In fact, it was not until 1912 that farmers themselves began to solicit the IAOS to help them establish cooperatives, rather than the other way around (IAOS, Annual Report 1912, p.3).[47] The choice by farmers about whether or not to adopt the cooperative organisational form

was thus a rather late phenomenon, and the IAOS lacked the widescale support that a successful social movement would require to take on the proprietary incumbents.

They might have succeeded anyway, if they had offered better results. O'Rourke (2007, p. 1366) explicitly argues that cooperatives were inherently superior because of the Danish example,[48] and indeed uses the Danish precedent to argue that 'the prior existence of private creameries was not an insuperable obstacle to the development of the cooperative creamery movement'. The question is then why the pre-existing private creameries in Munster did not convert to cooperatives. In fact, in Ireland, as the Industrial and Provident Societies Act converged to the Companies Act, cooperation did not possess clear institutional advantages. Also, as Guinnane et al. (2007, p. 17) illustrate, forming as a company was a relatively straightforward and inexpensive process. Moreover, the legislative differences between cooperative and proprietary are somewhat moot given that the Industrial and Provident Societies Acts facilitated switching from either company to cooperative or cooperative to company.[49] Furthermore, Henriksen et al discuss how Irish cooperative creameries prior to independence were additionally disadvantaged compared to their Danish counterparts, largely due to the impossibility of enforcing the binding vertical contracts necessary to secure the supply of milk to the cooperative (Henriksen et al. , 2015b). There were some transfers from private to cooperative, but these were at the behest of the IAOS who, according to O'Donovan (1940, pp 324-325), persuaded joint stock companies 'that it was unwise to invest capital in creameries in Ireland' leading to the sale of private creameries and conversion to cooperatives as early as 1901.[50]

Nevertheless, it is possible to find qualitative evidence for the superiority of the cooperative form in Ireland. This appears on closer examination, however, to be highly subjective and biased in favour of cooperatives. For example, O'Rourke (2007, p. 1365) cited an unknown witness to the committee on the Irish butter industry, who stated that 'in the case of private

creameries ‘(t)here is…no community of interest between the owner and the suppliers. The seeds of friction are always there, and the imposition by the proprietor, of regulations which are accepted as a matter of course in a co-operative creamery, at once leads to dissatisfaction and to reduced milk supply’. What is not mentioned is the fact that this witness is R. A. Anderson (H.C.P.P., 1910, 1910b), the secretary of the IAOS. In fact, the conclusion of the enquiry was critical of *cooperative* management stating that: ‘unfortunately, the committees of co-operative creameries are at times, extremely lax in the discharge of their duties. They do not always take a sufficiently keen interest in such important matters as costs of production, cleanliness of the milk supply, prices realised for their produce, and other conditions upon which the success or failure of the creamery depends. Furthermore, they do not always appear to realise the amount of good they can do by entering into the work of their staff, by encouraging a high degree of cleanliness in the premises and surroundings, and by rewarding efficiency in the working of their creamery' (H.C.P.P., 1910, p.19).

Other evidence is no more convincing. O’Rourke (2007, p. 1367) argues that Ulster creameries were more efficient, with a higher butter output per 1000 gallons of milk. This might be misleading for two reasons. First, this was a time, 1904, when the cooperative share was rather low in Ulster, at only 39 per cent. It is therefore not clear that the cooperatives were responsible for this result. Second, in terms of butter output per separator, Munster creameries had a higher output (H.C.P.P., 1906, pp 134-135). This suggests that much of the milk in the province was not going to butter production, and indeed, it turns out that data on condensed milk production ‘were not supplied’ to the Department of Agriculture and thus not published (H.C.P.P., 1906, p. 135). In 1899, the last year of data for condensed milk, 34 million pounds were produced in Munster alone (H.C.P.P., 1900, p. 20). This suggests that restricting the focus to butter output is a misleading indicator of partial efficiency, in particular because of the importance of condensed milk production for the private creameries.

Furthermore, there is evidence relating to the destructive impact of the IAOS on the existing dairy industry in Ireland: see for example Jenkins (2004) for a local study of the consequences of this competition. Henriksen et al. (2015b) describe the effect of pernicious competition for the limited supply of milk between cooperatives and proprietary operations, as well as between the cooperatives themselves, largely owing to the failure to enforce the binding rule.

This discussion mirrors a point made by Hansmann (1996), who argues that it is not possible to state that one organisational form is superior to another as ownership efficiency depends on the context. Hansmann (1996, 2013) suggests that the most efficient organisational form will be determined where the transaction costs for all patrons (owners) are minimised and that if efficient ownership forms are selected over alternative choices by either market forces or rational choice, this will result in the differential survival of the various organisational forms. Applying this framework to the case of the dairying industry in Ireland in late nineteenth and early twentieth century Ireland, we might expect that firms would select themselves into the organisational form which minimises transaction costs. The two main transaction costs related to the supply of milk and the supply of capital. For milk, in the absence of binding contracts, individual contracts had to be negotiated with each consignment of milk. Effectively, in the Irish case this meant that transaction costs were relatively similar for both organisational forms whereas in Denmark there was a clear advantage for the cooperative organisational form that was able to enforce vertically binding contracts. In the case of capital costs and liquidity costs, private firms, in addition to traditional bank finance, were able to trade on equity and debt markets in Dublin and London insuring lower costs and greater liquidity.[51] In addition, both company and cooperative legal codes in the UK shared the provision for limited liability thus shielding assets from the claims of creditors (Hansmann, 2013). Thus, there are plenty of reasons to suppose that cooperatives in Ireland are by no means a reflection of something

economically desirable, at least in the presence of an established dairy sector, which in itself goes a long way to explaining the relative failure of cooperation in Ireland.

5 Epilogue: the cooperatisation of the Irish dairy industry

The cooperatisation of the Irish dairy industry and the cooperative dominance of the historical narrative remains to be explained given the outline of the strength of proprietary creameries in Ireland shown in this article.

A recent history of the Dairy Disposal Board, a board established to nationalise and rationalise the Irish dairy industry in the Free State in the 1920s, explains this transition along normative lines as being a consequence of the 'milk wars' between cooperatives and proprietary creameries in the 1900s and 1910s. Ó Fathartagh (2014, p.3) argues that 'unlike in Denmark…proprietary creameries were generally in competition with what co-operative creameries there were. Curtailing the proprietary creameries would be a major prerequisite to rescuing the Irish dairy industry.' However, this view implicitly assumes that the cooperative organisational form was superior to the proprietary form. Yet, the findings of Henriksen et al. (2015a, 2015b) and the arguments outlined heretofore in this article place this assumption in considerable doubt.

An explanation for the cooperatisation of the Irish dairy industry appears to be related to the changing contemporary political environment in Ireland. Cooperatives had traditionally been closely associated with constructive Unionism, Molton (2017) gives several examples of landed gentry lending leadership to cooperatives pre-1914, the most poignant example of this being with the opening of a new cooperative at Goresbridge. The IAOS actively solicited the local gentry before opening the creamery, and Loftus, a member of the local gentry, performed at the opening ceremony of the cooperative creamery an hour before joining his regiment on active service in 1914. Following the war, creameries became more associated with nationalist

politics. Doyle (2014) argues that the affiliation with nationalism pre-dated the war and highlights the divergence between traditional parliamentary nationalism and cooperatives at the local level. Doyle (2014) argues that cooperatives gave farmers a taste of economic autonomy and this led to greater support for the newer forms of nationalism along the lines of Sinn Feinism. Furthermore, a key factor not to be downplayed were the attacks by Crown forces on creamery sites belonging to cooperative societies primarily in Munster.[52] These attacks were carried out as 'reprisals' for local republican activities and also because of a perceived connection between cooperatives and Irish Republican volunteers. The attacks on cooperatives led to widespread denunciation of this policy and public support for the affected cooperatives. Most notably funds were raised through the Irish White Cross to rebuild the damaged creameries.[53] At the same time, factories and creameries owned by Cleeve's were occupied in attempts to establish 'soviets' in the Irish countryside. Therefore, public sympathy and a change in political landscape gave the cooperatives greater political leverage. Thus, it should not be a surprise to find that it was the IAOS secretary, Henry Kennedy, who coincidently had been director of the aforementioned Irish White Cross, who lobbied the Free State government to nationalise the dairy industry under cooperative auspices (Ó Fathartaigh, 2014, p. 16).

Thus, post-independence, the situation changed dramatically. O'Rourke (2007, p 1376-1377) cites the overwhelmingly cooperative nature of Irish dairying post-1920 as evidence that Ireland, once independent, had no barriers to cooperation as there was elimination of rural/sectarian conflict. However, this had in fact much to do with the state regulation of the dairy industry post-independence. As Hansmann (1996, 2013) notes, although the most efficient organisational form for an industry might be market determined, the regulation of markets is also an important determinant of the organisational form chosen by an industry. With the establishment of the Irish Free State in 1921, state policy aimed deliberately to 'make the manufacturing of butter entirely co-operative and place the ownership of the premises and

direction of the industry in the hands of the farmers who supplied the raw material' (O'Donovan, 1940, p.339); and the elimination of propriety creameries was at the behest of the IAOS (Moulton 2017, p. 92). By 1926, out of 580 creamery and separating stations, 400 were cooperatively owned (O'Donovan, 1940, p. 339). Then, in 1927 the government founded the semi-state Dairy Disposal Company to rationalise the industry. Cleeve's and other smaller concerns were effectively nationalised under this new body, until the 1970s when the Dairy Disposal Company was broken up, and ownership was transferred to a number of farmer cooperatives.

6. Conclusion

We have argued that the competitive situation from incumbent proprietary operators faced by Danish and Irish cooperative creameries was very different, and that acknowledging this goes some way to explaining the relative failure of cooperation in Ireland, beyond cultural and legal challenges (O'Rourke, 2007; Henriksen et al., 2015b). Our argument parallels that made by Guinnane and Henriksen (1998), that credit cooperatives were relatively unimportant compared to savings banks in Denmark (despite Denmark's famous propensity to cooperate in other spheres) because the latter '*were there first*, and not because the savings banks were really 'better' in any sense' (their emphasis). Our argument echoes that of Bjørn (1982), since we find support for the idea that early proprietary creameries in Denmark were often similar to cooperatives, and eventually most converged on a 'standard' cooperative form. By contrast, in Ireland the lines between cooperative and proprietary remained blurred. This is somewhat at odds with some traditional cooperative histories that focus on a year zero (for example Rochdale in 1844, or Hjedding in 1882), the first year of cooperation (e.g. Birchall 1997). We provide a more nuanced perspective, and observe the evolution of organisational forms in different institutional contexts.

Whether or not cooperation offered advantages in an Irish setting, which is itself a matter for debate, the difficulties of establishing the new organisational structure in the face of massive operations like Cleeve's was surely considerable. Recognising this, the IAOS mostly located creameries in the north of the country where they could, however, never dominate the dairy sector or butter production before independence, leaving most of it in proprietary hands. In Denmark, early 'community creameries' often bore many characteristics of cooperatives (and might even have been classified as cooperatives in other contexts). What truly private enterprises existed were small scale and presented little obstacle to the wave of cooperation which swept the industry in the 1880s.

References

Aldous, M. (2015). Avoiding negligence and profusion: the failure of the joint-stock form in the Anglo-Indian tea trade, 1840-1870. *Enterprise and Society*, 16:3, pp 648-685.

Bielenberg, A. (2009). *Ireland and the Industrial Revolution: the impact of the industrial revolution on Irish industry, 1801-1922*. London: Routledge.

Bielenberg, A. and Ryan, R. (2013). *An Economic History of Ireland since Independence*. London: Routledge.

Birchall, J. (1997). *The International Co-operative Movement*. Manchester: Manchester University Press.

Bjørn, C. (1977). 'Fællesmejerierne – En fase i Dansk Mejeribrugs Udvikling 1860-1890'. *Bol og By* 2:1, pp. 65-80.

Bjørn, C. (1982). 'Dansk mejeribrug 1882-1914'. In: C. Bjørn (Ed.), *Dansk Mejeribrug 1882–2000*. Copenhagen: De Danske Mejeriers Fællesorganisation.

Boal, F. W. and B.S. McAodha (1961). 'The milk industry in Northern Ireland'. *Economic Geography* 37:2, pp. 170-180.

Bolger, P. (1977). *Irish Co-operative Movement*. Dublin: Institute of Public Administration.

Bonus, H. (1986). 'The cooperative association as a Buiness Enterprise: a study in the economics of transactions'. *Journal of Institutional and Theoretical Economics* 142:2, pp 310-339

Buus, N.P.J. (1886). 'Fællesmælkerierne i Jylland'. Offprint from *Landsmands-Blade*.

Donnelly, Jr., J.S. (1971). 'Cork Market: Its Role in the Nineteenth Century Irish Butter Trade'. *Studia Hibernica* 11, pp. 130-163.

Donnelly, J.S. (1975). The land and the people of nineteenth-century Cork: the rural economy and the land question. *Studies in Irish history*; 2nd ser., v. 9. London: Routledge and Kegan Paul.

Doyle, P. M. (2014). Reframing the "Irish Question": the Role of the Irish Co-Operative Movement in the Formation of Irish Nationalism. *Irish Studies Review* 22:3, pp 267-284.

Ellbrecht, G. (ed. 1916). *Danske Mejerier: Ill. Haandbog for Mejeribruget i Danmark.* Vol. II. Forlag Copenhagen: Selskabet til Udgivelse af Nationale Haandbøger.

Ellbrecht, G. (ed. 1917). *Danske Mejerier: Ill. Haandbog for Mejeribruget i Danmark.* Vol. III. Forlag Copenhagen: Selskabet til Udgivelse af Nationale Haandbøger.

Eriksson, F. (2008). Modernity, Rationality and Citizenship: Swedish Agrarian Organizations as Seen Through the Lens of the Agrarian Press, circa 1880-1917. In Pitr Wawrzeniuk (ed.). *Societal Change and Ideological Formation Among the Rural population of the Baltic Area 1880-1939*. Södertörns Högskola : Huddinge, pp 141-168

Espeli, H., T. Bergh and A. Rønning (2006). *Melkens Pris – perspektiver på meierisamvirkets historie.* Oslo: Tun Forlag.

Foley, J. (1993). 'The Irish dairy industry: a historical perspective'. *Journal of the Society of Dairy Technology* 46:4, pp. 124-138.

Foley, J. (1993). 'The Irish dairy industry: a historical perspective'. *Journal of the Society of Dairy Technology* 46:4, pp. 124-138.

Freeman, T.W. (1947). 'Farming in Irish Life'. *The Geographical Journal* 110: 1/3, pp. 38-55.

Gilbert, R.J. (1989). 'Mobility barriers and the value of incumbency'. In R. Schmalensee and R.D. Willig (eds.). *Handbook of Industrial Organization, Volume I.* Amsterdam:Elsevier.

Gosden, P.H.J.H. (1973). *Self-Help: voluntary associations in nineteenth century Britain.* London: B.T. Batsford.

Guinnane, T. W., Harris, R., Lamoreaux, N. R. and Rosenthal, J.L. (2007). Putting the corporation in its place. *Enterprise and Society* , 8:3, pp 687-729.

Guinnane, T.W. and I. Henriksen (1998). 'Why Danish credit co-operatives were so unimportant'. *Scandinavian Economic History Review* 46:2, pp. 32-54.

Hansen, S.A. (1972). *Økonomisk vækst i Danmark*. Vol. I: 1720-1914. Copenhagen.

Hansmann, H. (1988), 'Ownership of the firm'. *Journal of Law, Economics, & Organization*, 4:2, pp. 267-304.

Hansmann, H. (1996). *The ownership of enterprise*. Harvard: Harvard University Press

Hansmann, H. (2013), 'Ownership and Organizational Form' in Robert Gibbons and John Roberts (eds), *The Handbook of Organizational Economics*. Princeton: Princeton University Press.

Henriksen, I. (1993). 'The Transformation of Danish Agriculture 1870-1914', in K.G. Persson, ed., *The economic development of Denmark and Norway since 1870*, Aldershot: Edward Elgar.

Henriksen, I., M. Lampe and P. Sharp (2011). 'The Role of Technology and Institutions for growth: Danish Creameries in the late Nineteenth Century.' *European Review of Economic History* 15:3, pp. 475-493.

Henriksen, I., M. Hviid and P. Sharp (2012). 'Law and Peace: Contracts and the Success of the Danish Dairy Cooperatives'. *Journal of Economic History* 72:1, pp. 197-224.

Henriksen, I., E. McLaughlin and P. Sharp (2015a). 'Contracts and cooperation: The relative failure of the Irish dairy industry in the late nineteenth century reconsidered'. *EHES Working Paper* No. 71.

Henriksen, I., E. McLaughlin and P. Sharp (2015b). 'Contracts and cooperation: The relative failure of the Irish dairy industry in the late nineteenth century reconsidered'. European Review of Economic History, 19:4, pp 382-411.

H.C.P.P (1879-1907) Reports of the Chief Registrar of Friendly Societies. Friendly societies, industrial and provident societies, and trade unions, various years.

H.C.P.P (1879-1907) Return of Joint Stock Companies, various years.

H.C.P.P (1900). Agricultural Statistics of Ireland, 1899 [Cd. 143]

H.C.P. P. (1906) Agricultural statistics of Ireland, with detailed report for the year 1904. [Cd. 5092]

H.C.P.P. (1908) Department of Agriculture and Technical Instruction for Ireland. Agricultural statistics of Ireland, with detailed report for the year 1906. [Cd. 3791]

H.C.P.P. (1910). Report of the Departmental Committee on the Irish Butter Industry. [Cd. 5092]

H.C.P.P. (1910b). Departmental Committee on the Irish Butter Industry. Minutes of evidence, appendices and index [Cd. 5093].

IAOS (various years). *Annual Reports of the Irish Agricultural Organisation Society, Ltd.* Dublin.

Jenkins, W. (2004). 'Capitalists and co-operators: agricultural transformation, contested space, and identity politics in South Tipperary, Ireland, 1890–1914'. *Journal of Historical Geography* 30:1, pp. 87–111.

Jensen, P.S., M. Lampe, P. Sharp and C. Skovsgaard (2015). 'Getting to Denmark: The Role of Elites for Development'. *CEPR Discussion Paper* no. 12679.

Lampe, M. and P. Sharp (2014). 'Greasing the wheels of rural transformation? Margarine and the competition for the British butter market'. *Economic History Review* 67:3, pp. 769-92.

Lampe, M. and P. Sharp (2015). 'How the Danes Discovered Britain: The International Integration of the Danish Dairy Industry Before 1880'. *EHES Working Paper No. 66.*

Lampe, M. and P. Sharp (2018). *A Land of Milk and Butter: How Elites Created the Modern Danish Dairy Industry.* Chicago: University of Chicago Press.

Matthews, St. (2005). 'Cattle clubs, insurance and plague in the mid-nineteenth century', *Agricultural History Review*, 53, pp 192-211.

McLaughlin, E. (2015). 'Competing forms of cooperation? Land League, Land War and Cooperation in Ireland, 1879-1914'. *Agricultural History Review* forthcoming.

Moulton, M. (2017). ‘Not to Nationalise, but to Rationalise? Cooperatives, Leadership and the State in the Irish Dairy Industry, 1890-1932. *Irish Economic and Social History*, 44(1): 85-101.

O’Donovan (1940). *The Economic History of Live Stock in Ireland.* Cork: Cork University Press.

Ó Fathartaigh, M. (2014). *Irish Agriculture Nationalised: the dairy disposal company and the making of the modern Irish dairy industry*. Dublin: Institute of Public Administration.

Ó Gráda, C. (1977). ‘The Beginnings of the Irish Creamery System, 1880-1914.’ *Economic History Review* 30:2, pp. 284-305.

Ó Gráda, C., (2006). ‘Irish agriculture after the Land War.’ In Engerman, Stanley and Metzer, Jacob (eds.). *Land rights, ethno-nationality and sovereignty in history.* London: Routledge.

O’Rourke, K. (2007). ‘Culture, Conflict and Cooperation: Irish Dairying before the Great War’. *Economic Journal* 117, pp. 1357-1379.

Östman, A. C. (2008). Traditions of Gender, Class, and Language: Cooperative Organizing in a Finland-Swedish Community. In Pitr Wawrzeniuk (ed.). *Societal Change and Ideological Formation Among the Rural population of the Baltic Area 1880-1939*. Södertörns Högskola : Huddinge, pp 169-185.

Plunkett, H. (1905). *Ireland in the new century with an epilogue in answer to some critics. Popular Edition (revised).* London: John Murray.

Porter, J. (n.d/1909 British Library). *Porter’s guide to the manufactures and shippers of Ireland.* Belfast: Davidson and M'Cormack, first edition.

Rao, H., Morrill, C., and Zald, M. N. (2000). 'Power plays: how social movements and collective action create new organizational forms.' *Research in Organizational Behaviour*, 22, pp. 237–281.

Rynne, C. (1998). *At the sign of the cow: the cork butter market: 1770-1924.* Shannon: The Collins Press.

Schneiberg, M., King, M. and Smith, T. (2008). 'Social Movements and Organizational Form: Cooperative Alternatives to Corporations in the American Insurance, Dairy, and Grain Industries'. *American Sociological Review*, 73, pp. 635–667.

Solar, P.M. (1990). 'The Irish Butter Trade in the Nineteenth Century: New Estimates and Their Implications'. *Studia Hibernica* 25, pp. 134-161.

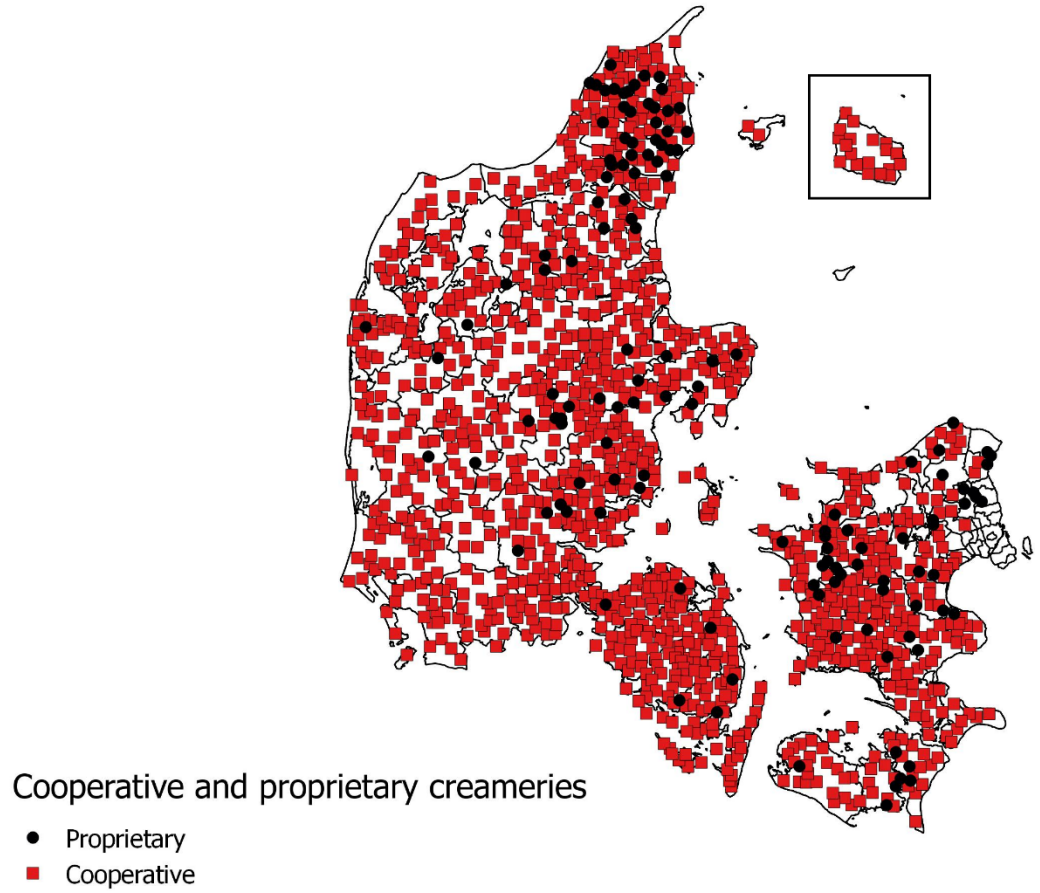
Taylor, D. (1976). The English Dairy industry, 1860-1930. *Economic History Review*, 29:4, pp. 585-601.

Teece, D. J. (1996). 'Firm organization, industrial structure, and technological innovation'. Journal of Economic Behavior & Organization. 31, pp. 193-224.

Wadhwani, R. D. (2011). 'Organisational form and industry emergence: Nonprofit and mutual firms in the development of the US personal finance industry'. *Business History*, 53:7, 1152-1177.

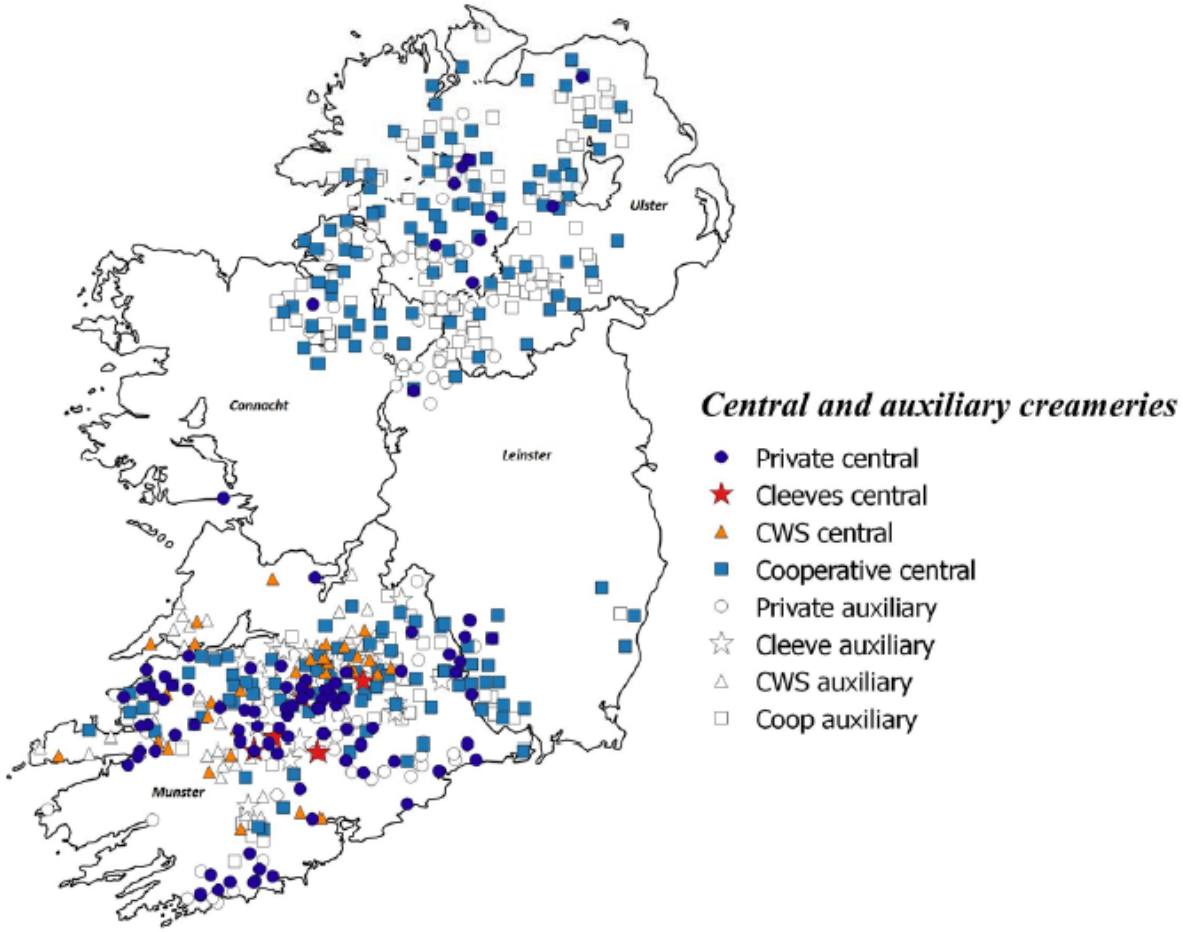
Wilson, J. F., Webster, A., and Vorberg-Rugh, R. (2013). *Building Co-operation: A Business History of the Co-operative Group, 1863-2013*. Oxford: Oxford University Press.

Map 1: The Location of Cooperative and Proprietary Creameries in Denmark, c.1914



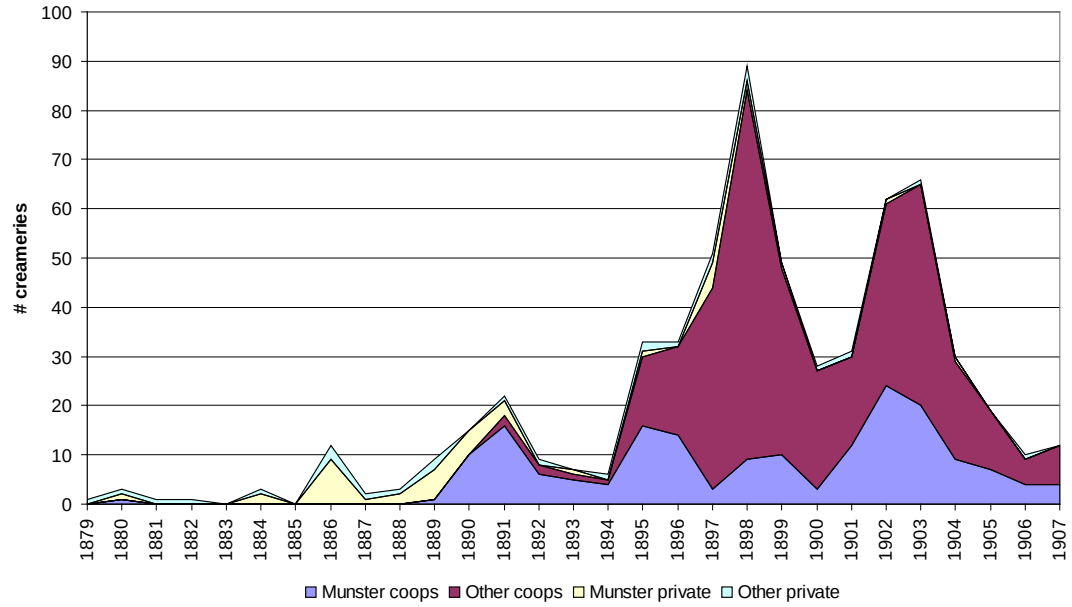
Source: Bjørn (1982).

Map 2: The Location of Cooperative and Proprietary Creameries in Ireland, c.1908



Source: Porter (n.d./1909 British Library) .

Figure 1: Establishment of Cooperative and Private Creameries in Ireland, 1879-1907



Sources: Reports of the Chief Registrar of Friendly Societies, 1879 to 1907; Return of Joint Stock Companies, 1879 to 1907.

Table 1: Number of Danish dairies by ownership

Year	Cooperatives	Private enterprises
1888	388	468
1894	907	215
1898	1013	260
1901	1067	209
1905	1087	207
1909	1163	255

Source: Henriksen (1993).**Note:** Private enterprises excludes estate dairies.

Table 2: Munster dairy industry, 1891-1904

	Number of creameries	Butter produced in creameries in Ireland	Condensed Milk produced in creameries in Ireland	Munster share of butter	Munster share of condensed milk	Munster share of Irish creameries	Cooperative share of creameries in Munster
		cwt	lbs	%	%	%	%
1891	152	121,309	[b]	88.51	100	70.39	
1892	175	138,703	11,537,580	88.18	100	75.43	26.52
1893	190	160,845	15,154,700	91.62	100	79.47	27.81
1894	226	248,425	13,238,641	94.75	100	77.43	29.71
1895	255	206,068[a]	21,126,320	93.13	100	80.39	24.39
1896	279	274,592	26,010,465	93.78	100	80.29	24.11
1897	324	294,105	20,980,505	92.02	100	77.16	20.80
1898	387	360,798	30,832,342	89.22	100	71.83	31.65
1899	480	387,710	31,081,118	78.11	100	66.04	20.82
1900	506	401,490	[c]	79.20	[c]	65.81	20.12
1901	547	437,302	[c]	76.35	[c]	63.62	19.25
1902	584	469,740	[c]	74.63	[c]	62.50	15.34
1903	612	483,283	[c]	76.17	[c]	62.42	18.59
1904	609	478,870	[c]	76.10	[c]	62.40	18.68

Notes:

a. It is unclear why there is a fall in output for 1895, but 1894 might have been an unusually good year, since it is somewhat above the trend growth.

b. 8,646,173 ‘cans’ of condensed milk, all of which was produced in Munster.

c. ‘no details as to the production of Condensed Milk were supplied to the Department [of Agriculture]’

Source: Agricultural Statistics of Ireland, 1891-1904

Table A1: Dissolved companies

Company	List of share holders	Creamery	Share capital	Shareholders	Incorporated	Converted to Industrial and Provident society	Liquidated/ wound up
Ballingarry dairy company							
Condensed Milk company of Ireland	Y	Y	350000	38			13/11/1923
Castlecor Dairy Company	Y	Y	829	49	18/3/1890	11/08/1927	
Irish creameries & exporters association	-	-	-	-	-	-	-
Drangan co-operative creamery	Y	Y	444	56	29/10/1897	31/07/1933	
Bandon co-operative stores	Y	General	4000	7	14/12/1899		15/03/1938
Golden Vein dairy companies	Y	Y	9000	9	16/07/1900		19/10/1938
Newmarket dairy company	Y	Y	20878	27	30/04/1904		22/06/1935
Irish dairymen	Y	N	10000	18	30/47/1919		28/08/1931
Ballimena Dairy Company							
Ballyhay dairy company	Y	Y	665	39		12/12/1923	
Buttevant dairy company	N	Y	-	-	-	25/06/1924	
Churchton dairy factory company	Y	Y	791	50		29/11/1924	
Galbally dairy company	N	Y	-	-	-	08/03/1922	
Cork Farmers Milk emporium	Y	General	4870	195	29/09/1921	30/01/1935	
United Irish counties milk producers	-	-	-	-	-	-	-
Irish creamery company ltd	N	N	2	1	21/04/1923		09/03/1928
Condensed Milk Company of Ireland (1924) ltd	Y	Y	85000	14	16/02/1924		25/04/1927
Puritas Milk Products company	N	Milk	250	-	12/03/1927		26/10/1927
Cleeve (Ireland) ltd	N	Y	-	-	19/05/1927		14/02/1929

X.L Dairies							
Irish milk products	Y	N	2	2	10/08/1929		
The Royal Meath Dairy ltd	Y	General	2000	5	08/08/1934		05/10/1943

Source: See text.

Table A2: Annual formation of dairy joint stock companies, 1878-1900

	Number of companies incorporated	Type of company liability	Dairy farmer company	Total number of shares taken by subscribers (mean)	Nominal capital (£) (mean)	Capital per shareholder (£) (mean)
1879	1	Limited	0	390	5000	12.82
1880	3	Limited	0	131	18000	216.14
1881	1	Limited	0	7	2000	285.71
1882	1	Limited	0	121	10000	82.64
1883	-	-	-	-	-	-
1884	3	Limited	3	23	3667	163.94
1885	1	Limited	1	190	3000	15.79
1886	12	Limited	12	67	1057	40.04
1887	3	Limited	3	63	833	39.99
1888	3	Limited	3	210	833	6.46
1889	8	Limited	6	184	34600	4651.64
1890	5	Limited	5	221	960	4.43
1891	4	Limited	3	139	13400	1792.28
1892	1	Limited	0	7	5000	714.29
1893	1	Limited	1	184	800	4.35
1894	1	Limited	0	7	2000	285.71
1895	3	Limited	1	50	3717	501.58
1896	1	Limited	0	7	1500	214.29
1897	7	Limited	0	14	10500	1473.15
1898	5	Limited	0	125	17440	2434.52
1899	1	Limited	0	7	2000	285.71
1900	1	Limited	0	7	12000	1714.29

[1] For example, see Lampe and Sharp (2014).

[2] We shall use the terms proprietary and private interchangeably throughout.

[3] A similar issue was faced by Norwegian cooperative creameries, which also faced competition from incumbent condensed milk producers, who could offer better prices to the peasants. This competition continued until the 1920s, when the world market for condensed milk became much worse and more variable: (Espeli et al., 2006, pp. 30-32).

[4] If true cooperatives (i.e. with a functioning binding rule) were indeed superior, this point also underlines one potential reason that the Danish cooperatives managed to dominate the British market for butter, with much of the Irish proprietary sector left to producers of e.g. condensed milk.

5 For a more econometric approach, see Jensen et al. (2015).

[6] A similar picture is seen in Sweden, which also based its dairy sector on the Danish example. The dominant organisational form in the Swedish dairy sector was cooperative by the turn of the century. But the real picture is more nuanced as many of the early cooperatives were not actually cooperatives but 'in-between forms of organisation'. The picture there resembles that of Denmark, since the traditional estates operating creameries were replaced by cooperatives based on the Danish model of cooperation (Eriksson 2008). In the case of Finland a similar pattern is evident. For example, one of the earliest Finnish dairy cooperatives, Broända Andelsmejeri, was initially formed as a private company in 1887 and later reorganised as a cooperative in 1891 (Östman 2008, pp 170-171). Östman (2008) shows how many of the early dairies were established as private companies with a limited number of shareholders, and a multiplicity of organisation forms existed in the late 1890s (cooperative, company, and individually owned). The earliest dairies tended to be found near estates. Following enactment of legislation facilitating the cooperative form more dairies formed as cooperatives and older peasant-owned dairies were transformed into cooperatives.

[7] Although in 1885 it was leased to a dairyman and converted to an ordinary community creamery, apparently because it had been plagued by disagreements, and already in 1878 two shareholders had left.

[8] Quoted by Bjørn (1982, p. 45).

[9] Before the centrifuge, cream was separated by waiting for it to rise to the surface of the milk. Transporting the milk over long distances homogenised it, making this process extremely slow. This was not however an issue for cream separated mechanically.

[10] See also Henriksen et al. (2011).

[11] Danish National Business Archives, 00482, Hørsted Fællesmejeri, 1750, 'Salgsbog' (1886-1888) and 1794, 'Hovedbog' (1884-1886); Danish National Business Archives, 03738, N. Chr. Larsen, 1744, 'Hovedbog' (1864-1869); Danish National Business Archives, 00090, A/S Sjørring Sø, udtørringsselskab, Sjørring, Thisted, 2, 'Selskabet som helhed, u.å. aktienoteringsprotokol' (1880-1914) / 29, 'Ejendomspapirer' (1838-1920 mm.) / 4, 'Driftsregnskaber' (1913-1918 mm.); Provincial Archives for Zealand, 506554, Høyberg, Frederik, 301/-5, 'Regnskab for Visby Mejeri'.

[12] Danish National Business Archives, 00349, Andelsmejeriet 'Albion', 3, 'Byggeregnskab og billede mv.' (1955-1955).

[13] http://danmarkshistorien.dk/leksikon-og-kilder/vis/materiale/kontrakt-for-hjedding-andelsmejeri-1882/, [retrieved 6 June 2018].

[14]http://danmarkshistorien.dk/leksikon-og-kilder/vis/materiale/kontrakt-for-strelluf-andelsmejeri-1883/?no_cache=1&cHash=987fc7ff3472a9f2b5cd91e3cf810448, [retrieved 6 June 2018]

[15] *Mediestream*: http://www2.statsbiblioteket.dk/mediestream/avis

[16] '*Fællesmejeri*' or '*fællesmælkeri*'.

[17] *Ribe Stifts-Tidende*, 8 October 1863, p. 2, 'Fællesmejeri' (originally from *Kolding Avis*).

[18] *Jyllandsposten*, 29 July 1877, p. 1, 'Thisted'.

[19] See for example *Horsens Folkeblad*, 6 June 1879, p. 2, 'Fællesmejeri'; *Kolding Folkeblad eller Sydjydsk Tidende*, 16 January 1880, p. 2, 'Fællesmejeri i Haderslev'; *Viborg Stifts-Tidende*, 13 March 1882, p. 2, 'Et Fællesmejeri', and *Folketidenden*, 12 February 1880, p. 2, 'Fra Midtsjælland'.

[20] *Fyens Stiftstidende*, 7 February 1877, p. 2, 'Mejeriudstillingen'.

[21] For example: *Frederiksborg Amts Avis*, 24 April 1878, p. 2 'Mælkeforfalskning'; *Fyens Stiftstidende*, 6 December 1878, p. 2 'Fyens Stifts patriotiske Selskab'; *Lolland-Falsters Folketidende*, 30 December 1878, p. 2 'Mælkeridrift i mindre Jordbrug'; *Viborg Stifts-Tidende*, 9 January 1879, pp. 2-3 'Om Oprettelse af Fællesmejerier'; *Horsens Folkeblad*, 28 March 1879, p. 2 'Sammenlignende Mejeriforsøg'; *Fyens Stiftstidende*, 28 March 1879, p. 2 'Det patriotiske Selskabs Møde'; *Fyens Stiftstidende*, 2 February 1880, p. 1 'Svendborg'; *Kolding Folkeblad eller Sydjydsk Tidende*, 3 February 1880, pp. 1-2 'De fynske Fællesmejerier'; *Morsø Folkeblad*, 10 February 1880, p. 2 'Mejerivæsenet'; *Morsø Folkeblad*, 18 February 1882, p. 1 'Morsø Landboforening'.

[22] *Morsø Folkeblad*, 6 April 1880, p. 2, 'Diskusionsmødet i 'Morsø Landboforening' d. 3. April i Nykjøbing';

[23] *Vendsyssel Tidende*, 3 February 1881, pp. 2-3 'Bør man her virke for Oprettelsen af Fællesmejerier?'; *Lolland-Falsters Folketidende*, 23 February 1881, p. 1 'Svar til hr. Jeppesen angaaende Mælkerispørgsmaalet'; *Fyens*

Stiftstidende, 15 March 1882, p. 2 'Landbotidende Ved K. Franzen; *Viborg Stifts-Tidende*, 16 March 1882, pp. 2-3 'Landbotidende Ved K. Franzen'; *Silkeborg Avis. Midt-Jyllands Folketidende*, 19 December 1883, pp. 1-2 'Silkeborg'.

[24] *Fyens Stiftstidende*, 29 January 1880, p. 2, 'De fyenske Fællesmejerier'.

[25] By which milk was separated by gravity in wide, flat bowls.

[26] *Horsens Folkeblad*, 23 January 1884, p. 2, 'Fællesmejeri og eget Mejeri'. See also *Lolland-Falsters Folketidende*, 29 March 1882, p.2, 'Fællesmejeri'; *Fyens Stiftstidende*, 21 April 1882, p. 2, 'Svendborg Amts landboøkonomiske Selskab'; *Horsens Folkeblad*, 13 February 1884, p. 2, 'Fra Odder'; *Silkeborg Avis. Midt-Jyllands Folketidende*, 15 February 1884, p. 2, 'Fællesmejerier';

[27] Reported in *Skive Folkeblad*, 6 March 1884, p. 2, 'Mejeri'. See also the following for examples of the cooperative versus community creamery debate in Denmark: *Lolland-Falsters Folketidende*, 7 March 1884, p. 2, 'Møde om Andelsmejerier'; *Jyllandsposten*, 29 March 1884, p. 2, 'Om Fællesmejerier'; *Horsens Folkeblad*, 20 December 1884, p. 2, letter to editor; *Herning Folkeblad – Vestjylland*, 31 December 1884, p. 2, 'Landboforeningsmødet den 27de December 1884'; *Thisted Amts Tidende*, 24 February 1885, pp. 1-2, 'Fra Smørudstillingen'; *Viborg Stifts-Tidende*, 23 March 1885, p. 2, 'Viborg'; *Silkeborg Avis. Midt-Jyllands Folketidende*, 24 March 1885, p. 1, 'Silkeborg'; *Jyllandsposten*, 11 April 1885, p. 2, 'Ved Smørudstillingen i Thisted'; *Thisted Amts Tidende*, 23 April 1885, p. 1, 'Beretning fra det thylandske landøkonomiske Selskabs Generalforsamling'; and *Holstebro Dagblad*, 2 December 1885, p. 2, letter to editor from H.P. Phlipsen, dairy manager at Kildevæld creamery near Taulov.

[28] *Fredericia Dagblad*, 14 April 1885, p. 1, 'Er det heldigt at anlægge Fællesmejerier?'.

[29] *Fyens Stiftstidende*, 16 September 1879, p. 2, 'Irsk Mejerikommision'.

[30] Ireland livestock farmers were the beneficiaries of non-tariff protection through infectious disease controls implemented in 1869 following an outbreak of cattle plague (rinderpest) in the 1860s. This hindered the export of livestock to the UK (see: Matthews 2005; McLaughlin, 2015).

[31] Companies Registration Office: dissolved companies [c. 1920-1960, Comp1\], National Archives of Ireland.

[32] http://www.irishstatutebook.ie/1924/en/act/pub/0021/

[33] There is also an element of survivorship bias to these records, since the IAOS had been actively encouraging the transfer of proprietary creameries into cooperatives, most notably the CWS creameries. Also, some of the main competitors to the cooperatives were headquartered in England and not registered in Dublin. These were the Cooperative Wholesale Society, the Scottish Wholesale Society, the Maypole Dairy Company, and Lonsdale &

Co (see Porter n.d./1909). The large firms that were registered in Ireland were representative of the creameries that competed with cooperatives earlier in the period, most notably Cleeve's.

[34] By this time Cleeve's owned 63 per cent of the creameries nationalised by the Dairy Disposal Co. (Bielenberg and Ryan, 2013).

[35] *Return of Joint Stock Companies*, 1879 to 1907.

[36] Curiously, Porter (n.d./1909 British Library) stated that many of the smaller joint-stock, 'though not strictly co-operative, are mostly owned and worked by the milk suppliers'.

[37] These were consumer cooperatives, operating private creameries.

[38] See for example O'Donovan (1940, p. 302), Freeman (, 1947, p. 48), Donnelly (1971, 1975) , Jenkins (2004, p.89).

[39] As Hansmann (2013) notes, firms may choose to organise under 'more heavily articulated statutes' – company acts and industrial and provident societies acts in the UK case – as they offer specific rules governing all aspects of the organisational structure..

[40] See Ó Gráda (1977), for more on the early history of the Irish dairy industry.

[41] The cooperatives had a combined loan capital of £500,719, but we have not found comparable records for Cleeve's.

[42] The name of companies as well as the 'objects of business' were searched for keywords such as 'butter', 'creamery' and 'dairy'.

[43] (Henriksen et al., 2015b,, p. 39; O'Rourke, 2007)). Although see also McLaughlin (2015) for another interpretation of the 'outrages' analysed by O'Rourke (2007).

[44] IAOS, *Annual Reports* 1906, 1905, cited in Ó Gráda (2006, footnote 9).

[45] The IAOS were offered the complete CWS creamery portfolio in 1904 but failed to reach an agreement as the IAOS wished only to purchase certain creameries. In 1909 despite being given first preference the IAOS only purchased one third of the CWS portfolio.

[46] Thus highlighting the complex relationship between the CWS and the IAOS; while the CWS was generally supportive of cooperative ventures, it differed from the IAOS in their view that cooperation should be in the field of distribution not production.

[47] For example, the Cappamore Agricultural and Dairy Society in County Limerick stated 'that we bear grateful recognition of the zeal and courtesy of the organisers of the IAOS in establishing our society' (IAOS, *Annual Report* 1906, p. 87).

[48] Henriksen et al. (2011) illustrate this superiority for the case of Denmark.

[49] Industrial and Provident Societies Act, 1893. (56 & 57 Vict.), c. 39, sections 54 & 55.

[50] The IAOS entered negotiations to purchase creameries from the CWS in 1901 but failed to reach an agreement (IAOS, *Annual Report* 1902, p.16).

[51] For example, Cleeve's issued £10,000 of 4% debentures on the Dublin Stock Exchange, whilst the Maypole Dairy Company issued equity on the London Market (Dublin Stock Exchange daily list, Friday August 1906, BR/DUB/77/3/47, National Archives of Ireland and *Investors Monthly Manual)*

[52] 'Report to November 1920 of co-operative creameries and other societies stated to have been destroyed or damaged by armed forces of the crown', *Irish Homestead*.

[53] *Report of the Irish White Cross, 1922*.