The ‘Transaction Cost Approach’ and the Performance of the Belgian Dairy Co-operatives Before 1940

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Abstract

We see that Belgian industrial dairy production before World War II lagged the developments of other countries in the same region and of the same size such as Denmark and The Netherlands. The share of home production remained remarkably high, while within the industrial segment the number of private to co-operative creameries was high compared to the more successful countries. We argue that this is no coincidence. Co-operative creameries were better suited to deal with the problems posed by the organisation and technology of dairy production at the time. The lackluster performance of the Belgian dairy industry was therefore connected to the underdevelopment of the co-operative sector. The co-operative spirit of Belgian farmers suffered due to some historical events such as the large scale introduction of farm cream separators and especially the outbreak of World War I. This erosion of co-operative spirit diminished the attractiveness and binding power of the co-operative creameries.

Keywords: Dairy Industry, Co-operatives, Creameries
JEL Classification: L14, N53, N54, Q13
1 Introduction\(^1\)

The Agricultural Invasion brought many changes for agriculture in Europe during the last decennia of the nineteenth century. One of the most important was the shift towards more production of foods of animal origin. This move was especially strong in those countries that did not resort to protectionism to support their agricultural sector. Most countries around the North Sea did not take important protectionist measures. In these countries the dairy industry took a big leap. Two important innovations were decisive for the development of the dairy industry in most of these countries. First, there was a technical innovation in the form of the invention of the cream separator, enabling industrial production of butter. Second, there was an organizational innovation; the co-operative creamery.

In this article the co-operative movement in the Belgian dairy industry since its beginnings until WWII is being examined. This movement is seen in an international frame of reference by comparing it to the developments in the dairy industry across the important countries of the North Sea area. Denmark with its well developed co-operative dairy industry, which came to dominate international markets, is taken as the benchmark of best practice. In many regions in the Netherlands the dairy industry could also boast a very strong record of performance. The Belgian experience however appeared to be more comparable to the Irish situation. There co-operative growth did not go flawless and most co-operative creameries kept struggling with many problems. The same goes more or less for Belgium. Co-operative growth was, although in some instances not without merit, certainly more moderate than in Denmark or the Netherlands and a lot more problematic. In this paper will be argued that the weaknesses the Belgian dairy industry struggled with, were at least influenced by the fact these co-operatives did not always behave as typical co-operatives which deprived them of some of their specific advantages contributing to the success of dairy co-operatives in other countries. This article also attempts to formulate a hypothesis on the deeper causes of this relative co-operative failure in the Belgian dairy industry. Like in the Irish case issues like trust and co-operative spirit are main determinants to explain the problems with cooperation. The transaction costs approach is used to analyse the history of co-operatives in an economic perspective. The impressive performance of the Danish co-operatives is well documented by amongst others Henriksen (Henriksen, 1999; Henriksen & O’Rourke, 2005; Henriksen & Hviid, 2005) and Hviid (Hviid, 2001). The Dutch dairy industry has been studied intensively by Dekker (Dekker, 1996), Geluk (Geluk, 1967) and others. The Irish case has been studied by scholars such as O’Grada (O’Grada, 1977) and O’Rourke

\(^1\) The author gratefully acknowledges the financial support of FWO-Flanders and the helpful remarks of the participants of the ‘ICAG Seminariereeks’ on February 6th 2009.
2 The Agricultural Invasion and Dairying in the North Sea Area

The last decades of the nineteenth century, the period which saw the onset of the Agricultural invasion, is sometimes referred to as an era of great inventions (Goodwin, Grennes & Craig, 2002, 154). The greater distribution of railroad networks, the development of steamships and later on the improvements in mechanical refrigeration lead amongst others to far better ways of communication and transportation between the different parts of the world. This growing market integration connected vast areas of arable land of the United States and to a lesser extent Russia with consuming masses of Europe. Compared to the canal system, railroads improved the transport of grains to the large ports. The introduction of steamships reduced freight rates substantially. The end of the Civil War in the United States released unutilized land, capital and most of all manpower to agriculture. This caused prices of grain and other crops to drop drastically from the 1870s onwards. These developments were accompanied by some coincidental misfortunes in European agriculture. Bad weather caused crop failures which were not compensated by higher prices for the crops because of the opening of the market for mass imports (Kindleberger, 1951, 31). Subsequently a large part of European agriculture, which was highly dependent on the production of grain, was thrown into a crisis. In various European countries different reactions ensued to this agricultural challenge (O’Rourke, 1997, 775-801). Most countries of the North Sea area such Great Britain, Denmark, the Netherlands and Belgium, did not resort to protectionism and thus underwent the complete consequences of the transformation. The Agricultural revolution had overall a rather strong deflatory effect on food prices, however products resulting from livestock farming held their ground better.

Those factors made switching to more animal farming in form of pig breeding, or cattle breeding for meat or dairy a valid option for distressed farmers. Most countries in the North Sea area did indeed develop a tendency towards more animal farming, and dairying in particular, or intensified this trade when it was already present. England enjoyed a remarkable rise of liquid milk production and trade owing to the proximity of enormous consumption centres such as London and the other rising industrial cities, and the growing purchasing power of the industrial working population living there (Taylor, 1976, 585-601). This trade of liquid milk alone was so successful that the profitable butter trade for these cities was left almost entirely to import of foreign producers. Some parts of The Netherlands knew a long tradition of dairying. Frisian butter was very famous on the foreign markets receiving during a long time only the best prices for their products. After the transitions of the agricultural invasion took place however, other parts of The Netherlands, such as the eastern and southern sandy regions, started to divert their
attention more towards dairying as well (Bieleman, 2003). More or less the same situation applied for Belgium. The Flemish butter, which was produced at the low fertile coastal regions of Belgium, enjoyed a very good reputation on the London market, at least until the mid nineteenth century. Its name however tarnished somewhat after this period due to widespread adulteration with lesser butter or even other products like margarine (De Baere, 1971, 18). In some of the more sandy inland regions some butter was produced as well whose quality was initially considerably lower. Ireland finally counted as the traditional mass supplier for butter on the English market (O’Rourke, 2004b; 2007). Until the late 1870s it was still by far the largest butter producer for this market (O’Rourke, 2004a, 9). Hereafter however, Ireland lost a substantial market share to its competitors, especially Denmark, at a quick pace.

The most remarkable transition because of the Agricultural invasion though, took place in Denmark. Initially in the nineteenth century the big Danish agricultural sector was focused on grain production, mostly meant for export to Great Britain, and on cattle breeding for the export of live cattle and meat to Germany. The international effects of the Agricultural invasion prompted Danish farmers to make a quick transition towards dairying. New however was the way in which this production became organized in Denmark. At first butter production took place on the farms in the whole of Europe. The invention of the centrifugal cream separator in 1877 made a more industrial way of production possible and preferable. For this technical innovation to be profitable this system needed much more milk than any one farm was able to offer. The first creameries that arose were regular private firms that operated through market contracting. But after a few years an important organizational innovation took place. In the county of Ribe in the south-west of Jutland, the first co-operative creameries were founded in 1882 (Henriksen, 1999, 63-64). These organizations proved very successful and before long their system was copied all over Denmark. For some years the two systems; private creameries and co-operative creameries, coexisted in Denmark. But around 1890 co-operatives clearly took the upper hand. Around 1903 81 per cent of all milch cows owners was member of a co-operative (Henriksen, 1999, 57). The results of this organizational innovation were no less than astonishing. Danish butter which was mostly meant for export to Great Britain suddenly dwarfed foreign competition with regards to volume and consistently obtained the highest prices. Denmark catapulted itself in no time as the prime butter producer for the English market.

3 Following Denmark’s Example

This success did not go unnoticed in the surrounding countries. Most countries in the north sea area acknowledged the achievements of this system and tried to imitate it to some extent. In the Netherlands the situation can be divided into a few geographically distinct developments. As said, the northern province of Friesland, a coastal region of predominantly low lying, moist clay
grounds, had a tradition of cattle breeding and dairy, mostly aimed at the English market (Bieleman, 2003). Adulteration however tarnished the name of the Dutch butter, and the Netherlands became also known as a country of imitation butter (Bakker, 1993). Since they furthermore continually lost market share on the British market, Frisian farmers looked to their Danish competitors for improvement of their situation. They noted that industrial processing of butter provided good results in Denmark. Until 1885 five private creameries were founded. In 1886 the first co-operative creamery was established in the town of Warga (Bieleman, 2003). The number of creameries increased quickly. In 1898 there were 60 in this province only. Most of the affiliated farmers possessed large farms with many cows. Therefore the creameries were most of the time rather large as well and steam powered. The situation was different in the rest of the country. The eastern and south-eastern parts of the country were covered with less fertile sandy grounds. Both the southern provinces Limburg and Noord-Brabant and the eastern Gelderland and Drenthe had an agrarian sector in common, consisting mostly out of mixed farms whose activities were split among cattle breeding and agricultural activities. These firms were mostly small which meant that the average farmer owned only one or a few cows. After the agricultural invasion focus switched more to cattle breeding and dairying in these regions. Since dairy production increased in importance but the quality of the butter was deplorable some farmers of these regions looked to more successful dairy regions for improvements. A few years after the first experiments in Friesland, the beginnings of the creameries were seen in the sandy regions. In 1889 the first co-operative creamery was founded in Drenthe following the Frisian example. In the southern provinces the first creamery was established in 1891 in Tungelroy close to the Belgian border when the local farmers saw the success achieved by the Belgian co-operative creameries on the other side of the border. Hereafter this new system also spread quickly in the sandy Dutch regions. Where the creameries in Friesland were mostly among the larger steam creameries, the ones in the sandy regions chose mostly for a smaller design with mechanical manual powered creameries. This meant that for the sandy regions creameries were small and quickly became too small. In the beginning of the twentieth century therefore these smaller manual powered creameries were systematically replaced by larger steam creameries (Van Zanden, 1985, 272). Sometimes the close-by co-operatives merged into larger units with a larger field of activity. Next, these larger co-operatives joined forces into larger associations which coordinated the dairying activity (Bakker, 1993, 132). So after 1910 in those regions where creameries constituted an important part of the agricultural activities, the dairy industry became more and more a large scale modernized activity.

Ireland was probably traditionally the most important supplier of dairy products for the English market. Both Ireland and Denmark were agriculturally oriented countries and competed for the British market for animal products such as bacon, eggs and butter (O’Rourke, 2007a, 1360). That was why in this country the pressure of the successful Danish dairy producers on the English
market was felt the most. So here as well, farmers looked with envy to their Danish competitors and studied them as a way to improve their competitiveness. In 1889 the first co-operative was established at Drumcollagher in Limerick. From then on this new form spread rapidly and by 1905 there were over 300 co-operatives active in Ireland. Co-operatives grew rapidly and became very important in Ireland, but it would not be correct to say they dominated. In 1906 there were 800 creameries out of which less than half were co-operatives. The private entrepreneurs were often butter traders who enjoyed considerable advantages because of their knowhow and connections on the British butter market. Still, even in 1920 half the supply of milk was still processed outside of the factory segment (O’Grada, 1977, 289). Also the occurrence of co-operatives in Ireland was strongly geographically dispersed. The fact that the prices the Irish received for their butter on the British market remained consistently lower than those of the Danish indicates that the success of their creameries and butter producers did not match that of the Danish (O’Rourke, 2007a, 1362). The difference between the Danish and the Irish dairy industry was mainly that much less of the Irish butter was produced in creameries and more specifically co-operative creameries.

4 Co-operative Theory: Transaction Costs Approach

To analyse the advantages and drawbacks of co-operatives and of investor owned private creameries we make use of the transaction cost approach (Staatz, 1987, 87). The hypothesis is that the structure an enterprise takes on in a specific environment is a reflection of the attempt of that enterprise to minimize the total production and transaction costs involved between the firm and all of its patrons (Hansmann, 2000, 21). This approach results from efficiency arguments. In a kind of Darwinian environment the market participants and the market itself select that solution that minimizes the costs. The most efficient structure will then become dominant. Two of these possible structures, the co-operative and the investor owned firm are important for our analysis of the creameries. We define a co-operative here as a business that is owned by their patrons, these being the people having a stake in the company besides owning it. These patrons can be suppliers of the firm, consumers of it, or work for the firm. In contrast, at an investor owned firm, these relationships with the patrons are maintained by market contracting and not by ownership. The private creameries were examples of investor owned firms, where often a larger farmer or butter trader bought the necessary equipment and started with the industrial production of butter, depending on contracts with the farmers for their regular milk supply. In case of the dairy industry the co-operative creameries were owned by their suppliers, i.e. the farmers who delivered the milk to the creameries as a kind of vertical integration. These creameries supported the farmers’ prime livelihood; the production and sale of milk.
There were a few distinctive characteristics that made up a co-operative creamery (Henriksen, 1999, 64). Membership was in principle open to anybody producing milk. Members had to buy one share for each cow they owned. Also in theory, supplying milk to the creamery was reserved for members. Members had a claim on the eventual profits which were distributed among them by means of dividends. These dividends were distributed according to the amount of supplied milk. Of course they also had to share possible losses or remaining outstanding debt. The co-operative was under the control of the members by a one man one vote principle at the board. Day to day decisions were often made by a manager appointed by this board. The statutes of the co-operative usually had some other typical rules the members had to comply to. As members they were supposed to supply all their milk, besides the part used for home consumption, to the co-operative creamery. They were also obliged to remain a supplier for the co-operative for a certain period of time, for example the duration of the loan, which the creamery had taken out for its investments. These rules made sure that the creamery had sufficient supplies to cover its fixed costs and the setup costs that were made.

The focus of the transaction costs approach lays on the transaction costs of marketing a product. This involves the whole chain the product goes through, from the raw materials until the finished product. Transaction costs occur at each link of the chain, at each separable transformation the product undergoes. These costs include costs of information such as search and selection costs, bargaining costs between the involved parties, monitoring and enforcement cost to check whether other parties keep their part of the agreement. For our research there are four important principles that determine the choice of organizational structure².

First there is the asset fixity principle which states that the more specialized assets become, the less likely they are going to be allocated by market contracting. An asset becomes more specialized when the cost of transferring this asset to an alternative use or selling it becomes higher. This means that the investment in those assets is at least to some extent non recoverable when one intends to divest. Normally when someone invests in assets he hopes to obtain a higher revenue than the acquisition price. However as long as the net present value of the revenues is higher than the resale value or the possible alternative use, he will normally not divest. This gives a possibility for other market participants to act opportunistically in transactions with the owner of these assets. In industries where competition between suppliers is less than optimal these suppliers can demand higher prices than the market price for their goods from the entrepreneur who owns these specific assets, since he cannot divest without considerable losses. Of course this threat of opportunism can cause people to shy away from investments in these

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² This section is indebted to Staatz (1987).
kinds of immobile assets, although they would have been profitable of socially beneficial in absence of opportunism.

The second important concept is the uncertainty principle. This states that market contracting becomes a less efficient means when the uncertainty surrounding the particular transactions increases. For example when prices of the produced goods tend to fluctuate a lot the formations of co-operatives or vertical integration of firms becomes more likely. After all when prices fluctuate, earnings of the companies will fluctuate, so will the prices they are able pay to their suppliers. Renegotiation of contracts is costly. Thus a system of contingency pricing, where the price paid to the suppliers can change according to the prices realized by the company for its finished products can be a lot more efficient. This however is difficult to obtain for regular investor owned firms. Co-operatives owned by the suppliers have a much better chance, or when a firm integrates vertically and incorporates their suppliers the problem is also solved.

The third determining concept is the externality principle. This principle states that when other market participants within the production chain can impose negative externalities, meaning that they cause harm to the products of the firm and thus to the firm which has no impact on their acts, the firm has an incentive to integrate vertically. This is not a far fetched argument. If other market participants, for example the suppliers, act careless with their raw materials it can affect the finished product of the firm and thus the received prices. The same can happen when the distributor doesn’t show proper caution with the products. On the other hand when good care is taken of raw materials or distribution it can have positive effects on the finished goods. The problem is that there is often an asymmetry in information between the different links of the production chain. This means they are not always immediately aware whether proper effort is put in the handling of the products in other stages of the production chain. This might lead to the wrong incentives for the different actors.

The fourth principle which regulates the organizational decisions within the production chain is the hierarchical decomposition principle. This means that for a business to operate smoothly the internal organization should be designed in a way that the operational decisions and the strategic decision are clearly distinguished. To enable this and improve the activity of the business incentive schemes should be thus that they promote efficiency. This principle makes sure that decisions are taken optimally at each level of the business. If farmers join a co-operative, this enables them to outsource some of their strategic planning while fully focusing on the daily operational activities.

If we apply this theoretical basis on the dairy production and the butter market there are already a couple of deductions we can make about the optimal organizational structure in the
production chain. For dairy production a lot of investments must be made in rather specific assets by most involved parties. The farmers had important investments in for example land, cows, and, after some time, more and more in specialized equipment. Some of these investments had to some extent a specific character. Farmers were mostly relatively locked to their land, sometimes for generations, stables had to be build and some equipment had to be purchased. The creameries had more specific investments in specialized expensive and immobile equipment like the cream separator, which could not be used for an alternative means and were not easily resalable. This made market contracting a less attractive option since it also opened the possibility for opportunistic behaviour by one or both parties. The farmers had in those the advantage of being able to process the milk on their own farms, albeit not for the same price as they could receive at the creamery. Thus they were less dependent on the creameries than the other way around. Concerning the uncertainty involved we could note that the butter prices were of a quite changeable nature, leading to considerable uncertainty. Butter prices received by the creameries were for a large part determined by the national and even international butter prices. Co-operatives found it easier to pay their suppliers/owners for their milk according to these international prices. The possibility of the suppliers imposing negative externalities on the creamery and also on the other suppliers was very high. Fresh milk was very easily perishable, and also sour or contaminated milk could not always immediately be recognized. This difficulty was even aggravated because small amounts of bad milk or just milk of low quality could diminish the quality of large batches of butter, or even render them unfit for sale. There were also potentially big problems with farmers willingly diminishing the quality of their milk through adulteration, by lowering the fat content of the milk or by just pouring water into the milk. These problems could by some extent be diminished by the establishment of co-operatives with the farmers as owners of the creameries. Finally the organization of co-operatives also complied with the hierarchical decomposition principle. Some strategic planning could be done by the management of the creamery while the operational decisions could be made quickly by the farmers on their own farms. Although the management was not always optimally placed to monitor all operational activities of the farmers, incentives were still aligned, since the farmers were also owners of the creamery and were able to monitor each other in some instances. This would not have been the case when the creameries were established as private enterprises.

We can concretize these theoretical ideas even further. The problem of the investment in specific assets is one of lock-in (Henriksen, 1999, 62-63). More specifically the owner of a creamery is locked in by the farmers that supply it with milk because of the asset fixity principle. Since the creameries needed fresh milk on a regular basis, as they had large fixed costs, and because of the high transport costs of the milk, they were very dependent on a limited number of farmers. Only those farmers who lived within a certain limited range of the
creamery could supply it. This gave those farmers a way to exercise market power. This meant that the farmers could probably demand higher prices than under perfect market conditions but it had other consequences as well. First, because of these large fixed costs average costs tended to diminish with growing production. Economies of scale were important. The large dependency on few suppliers made creameries continually insecure about the amount of milk that would be supplied to them in the future. The good bargaining position of the farmers and potential competition or other options such as home processing, made the farmers very reluctant to engage in long-term contracts with the creameries (Dekker, 1996, 63-64). But even if contracts would exist, enforcing them could be costly. This meant that the private firms lacked adequate means to prevent the suppliers from leaving when they found it expedient. When enough suppliers would then turn their back to the creamery, its profits and its competitiveness would come under serious pressure. Second, the private creameries suffered from the drawbacks of asymmetrical information. As mentioned above, problems existed with farmers that supplied the creamery with low quality milk. The quality of the milk depended on two factors; its fat content and the freshness and cleanliness (O’Rourke, 2007a, 1363-1364). Causes of possible lower quality of the milk could be twofold; carelessness or adulteration. Low quality milk could hamper the production of quality butter seriously, which had large effects on the income of the business and all of its suppliers. The private creameries did not posses a good way to handle this problem. Monitoring of its suppliers was not always easy. Although it took not long before instruments were in use that were able to measure the fat content of the milk this was not a big help for most private creameries (Henriksen, 1999, 67). Many farmers did not trust the instruments very well and would not submit to these controls. Besides if the manager of the creamery made the controls he would have had incentives to cheat or at least feign a lower fat content. The market power of the suppliers put them in an advantageous situation against the creameries and enabled them to refuse the controls. But even if the private creameries were able to monitor their suppliers or to measure the fat content it usually did not help them any further. If the private creameries detected fraud they were not able to refuse the milk so well because of the explained economies of scale (O’Rourke, 2007a, 1366). So, refusing milk or even any other way of punishment of bad suppliers was relatively difficult for private creameries. Not accepting milk from bad suppliers anymore in the future was not credible as a threat either. This problem was particularly pressing if other creameries in the region were available and willing to accept milk from suppliers that were refused elsewhere for example to cover their own large fixed costs (O’Rourke, 2007a, 1364). Private creameries were therefore under a threat of opportunistic behaviour by their suppliers in the form of delivering low quality milk, or even not delivering at all. This made large long-term investments for these firms a very risky business, often left the creameries in continuous competition for suppliers, and could also affect the quality of the produced butter.
Co-operatives had better means of dealing with these problems. For starters farmers had a vested interest in the co-operative since they were partly owner of it. This meant that the co-operatives means to react to opportunistic behaviour were more extended and credible than those of private creameries. First of all, the farmers were, as joint owners, more motivated and better suited to monitor their neighbours, and more likely to report and protest against any form of opportunistic behaviour. Farmers were less ideally placed to ignore critique, disapproval or controls from their peers. If opportunistic behaviour still took place some kind of punishment could ensue. As we saw before, the costs of a private creamery trying to punish defecting behaviour of its suppliers were quite high, while it inflicted relatively little harm to the supplier. This was what made the threat of punishment not credible. The co-operatives on the other hand had multiple ways of punishment which also acted as a deterrent. Some had, at least to some extent, a financial character. When a farmer chose to exit a co-operative prematurely, the creamery lost a part of its daily milk supply which reflected badly on its average costs as it did with private creameries, but the co-operative could withhold the share of the supplier in the co-operative and the dividends for that year. The supplier could still be obliged to pay back his share of the outstanding debt. These benefits compensated the loss of the milk supplies to some extent for the co-operative. These were not options for a private creamery. These benefits that could obtained when a supplier left also made exclusion from the co-operative a credible threat for grave or repeated offences of the suppliers, such as repeated carelessness, adulteration or not delivering (all of their) milk to the co-operative. Finding a new place to sell the milk was not always easy for the farmer since other co-operatives did in principle not accept members that were excluded elsewhere (O’Rourke, 2007a, 1366) For a private enterprise to do the same the inflicted harm was a lot lower and the costs for the firm higher. For minor offences the option for the co-operative could be to refuse the milk and/or to fine the supplier. Since this was done by its peers, it was harder for the farmer to resist these actions. Another way of punishment for opportunistic behaviour had more of a social component and may be described as a form of social ostracism. This was linked to the fact that farmers had in the case of the co-operatives explicit or implicit contracts with their peers instead of with a less closely related ‘entrepreneur’. Behaving opportunistically against a private entrepreneur was one thing, but getting caught on being disloyal your peers, joint owners and from the same class, especially when their livelihood was on stake, was from a totally different order and most definitely frowned upon in typically tightly knit agricultural villages. Being caught was probably very shameful and highly destructive for one’s reputation. Because of their better means of punishing defecting behaviour of the suppliers by inflicting larger financial losses for the defecting supplier and the threat of social ostracism, co-operatives were better at building trust between the

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3 Archive KADOC KULEUVEN, Boerenbond Hoofdbestuur. Dossier zuivelconsulentschap 5.11, p.120.
creamery and the suppliers and amongst the suppliers. In this way they could in theory deal with lock-in problems and asymmetrical information, and deliver butter of a better quality cheaper than the private creameries. The ultimate reason for this is that by credibly binding the suppliers to the creamery, they did not escape lock-in by their suppliers, but instead they created a mutual lock-in which rectified this market failure and restored the balance between the different parties. The trust between the co-operative creamery and the members and among the members themselves enabled the farmers to make more specific investments in dairy production such as enlarging their herd, buying foodstuffs or investing in stables and in dairy processing by investing in the co-operative. This signaled once again their commitment and contributed in this way to the virtuous circle. The same strategy was used to ensure the co-operative of both a sufficient amount and high quality milk by credibly binding the suppliers to it. However there is one caveat to this. This method is based on trust and commitment to the co-operative. If this trust and commitment for some reason break down, the system loses much of its advantages. In extreme cases the co-operatives can suddenly prove to be quite fragile institutions which can even lead to runs on these co-operatives exactly because of their initial strength, the concomitant sharing of the fixed costs among members (Rey & Tirole, 2000, 25).

This mutual lock-in meant that the co-operatives were potentially a very advantageous way of organizing the dairy industry, offering many benefits compared to the private creameries. Transaction costs of market contracting were definitely higher compared to those of the co-operative way. However we should also briefly look at the costs of ownership itself to check whether they weren’t prohibitive for the farmers to own their creameries. According to Hansmann (2000) however, these costs were on the contrary exceptionally low. Monitoring of the operations of the firm is relatively easy, because of the geographical proximity of the farmers to the creameries and their almost daily transactions with it. This made that the farmers were usually well informed about the creamery. Decision making seemed to go relatively smoothly as well, although this could have been a hard job, when interests between the different farmers diverged. Yet, the farmers and their interests appeared to have been relatively homogenous. The fact that they used the one man one vote principle underlines this. The interests of the small and the large farmers ran parallel to a large extent. They were all dairy farmers working with the same commodity, their primary objective being to maximize their level of net income (Royer, 2004, 8). Of course owning a business always bore a certain risk (Henriksen, 1999, 63). However in the case of the co-operatives, as shown above, the risk of ownership was in normal circumstances decreased, exactly by this very ownership. The capital necessary to establish a firm was raised from the farmers themselves by means of the shares they had to purchase, and most of the time relatively cheap loans could be obtained by credit co-operatives of specialized farmers’ banks. Naturally there was an opportunity cost to the capital they spent on the
creamery, but most of the time it turned out to be an excellent investment to support their livelihood.

5 The Co-operative Dairy Sector in Belgium 1890-1940

With this information at our disposal it will be interesting to look at the developments in the Belgian dairy sector. As mentioned before there were some parts in Belgium which had a tradition of production of high quality butter and export, such as the Western part of Flanders, but this tradition had suffered in the second half of the nineteenth century. It was not in these traditional circles either that the first adoption of foreign innovations had to be found. In Belgium the technological innovation of the mechanical cream separator and the organizational of the co-operative creameries, were noticed as well. The consequences of the Agricultural Invasion were also felt and resulted in an agricultural crisis. Rather quickly the first experiments ensued. The liberal Member of Parliament Lippens appeared to be the first to establish creameries, one in Ghent in 1883 and one in Knokke (De Baere, 1971, 20-21). However their lifespan seemed to have been limited.

Often the year 1887 is seen as the real start of the industrial butter production in Belgium with the establishment of two private creameries, in Stabroek and Cul-de-Sart. One year later the first co-operative creamery was formed in Oostkamp, under the directions of Baron Peers. After a visit to this co-operative by farmers from Limburg, a province in the sandy north-east of Belgium, a co-operative was formed in Bree in 1890. Only five years later already thirty co-operatives were functioning in Limburg (De Winter & Tambuyzer, 1956, 416), in 1897 there were fifty-six (De Baere, 1971, 21). In the other provinces the developments were remarkable as well. In 1897 there were already 271 co-operative creameries founded in Belgium. The following table exemplifies this development:

4 These creameries later evolved to cooperative creameries.
Table 1. Co-operative creameries in the Belgian provinces before 1900

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</tr>
<tr>
<td>East-Flanders</td>
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<td>1</td>
<td>1</td>
<td>4</td>
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<td>6</td>
<td>7</td>
<td>12</td>
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</tr>
<tr>
<td>Hainaut</td>
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<td>6</td>
<td>6</td>
<td>8</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>32</td>
<td>40</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liège</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>11</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limburg</td>
<td>1</td>
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<td>6</td>
<td>12</td>
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<td>48</td>
<td>71</td>
<td>97</td>
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<td>Luxembourg</td>
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<td>1</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Namur</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>11</td>
<td>12</td>
<td></td>
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<tr>
<td>Belgium</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td>19</td>
<td>23</td>
<td>27</td>
<td>36</td>
<td>55</td>
<td>78</td>
<td>138</td>
<td>271</td>
<td>327</td>
</tr>
</tbody>
</table>

Source: De Baere, 1971, 22

Table 1 shows that especially Limburg showed a strong performance in the early stages of industrial butter production and that West-Flanders appeared to be the laggard. This is remarkable since it was exactly West-Flanders that had until the middle of the nineteenth century a very strong reputation of butter production, also on the British market. It was exactly this old reputation of farm butter production that kept those farmers away from more modern creamery production. The numbers of Luxemburg are also rather impressive, but they need a short comment. The creamery system in Luxemburg differed somewhat to the system that was used in the rest of the country. Almost every village had its own small unit of a larger creamery or butter factory, which only skimmed the milk supplied by the local farmers. The resulting cream was then sent to the larger central creameries which produced the butter and were supplied by many of those smaller units. Since probably most of these smaller units were included in the census, this will give an upward bias to the number of Luxemburg. Finally the creameries of Limburg and East-Flanders were on average very small. Even with this side notes we can see that the developments in the Belgian creamery sector in the 1890s were substantial.

Two types of creameries came to the front in Belgium. Initially, most of the creameries were of the smaller manual powered variant. Because of their smaller size these manual powered creameries were ideally suited to service an area of the size of a regular agricultural parish or village and fitted in this way well in the Belgian social structure of the countryside. The steam powered creameries were at first less prevalent, but still played an important role in some regions such as Luxemburg, in the richer larger towns, or close to bigger cities. Most of these creameries were of the co-operative type, but this does not mean that private creameries were absent. Unfortunately there are for these initial phases no real statistics about the number of private creameries. Lefebvre and Segers (2003) estimated that at the end of the nineteenth
century the private creameries made up around one third of the total number of creameries. The sector of consumption milk furthermore consisted almost completely out of private creameries. However, only 22 per cent of all produced milk was processed industrially at the time. So the big majority of milk production was still processed at the level of the farm.

Graph 1. Number of active dairy co-operatives in Belgium before World War I

![Graph 1](image)

Source: Annuaire statistique

After 1900 some structural changes in the development of the dairy industry come to the front. The number of active creameries appeared to stabilize throughout most of the following decade. There was a for the creameries disadvantageous tendency towards home processing by the farmers (De Baere, 1971, 30). This new trend coincided with the large scale introduction of the home cream separator. It was a Belgian firm, Mélotte, which specialized in this kind of separator that could be operated manually and on a low capacity. The system was built on a first design by the firm in 1888. Especially after the turn of the century, when this machine was marketed heavily, it became very popular with the farmers. Other companies in agricultural machinery such as Persoons and Delmotte quickly followed Mélottes suit and introduced their own home separators. Of course this also gave an important impetus to home processing of milk and hampered the further growth of the creameries (Niesten, Raymaekers & Segers, 2002, 50).
Table 2. Milking cows and home separators in the Belgian provinces in 1910

<table>
<thead>
<tr>
<th>Province</th>
<th>Milking cows</th>
<th>Home separators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antwerp</td>
<td>104,305</td>
<td>5,521</td>
</tr>
<tr>
<td>Brabant</td>
<td>135,624</td>
<td>7,095</td>
</tr>
<tr>
<td>West Flanders</td>
<td>136,452</td>
<td>4,196</td>
</tr>
<tr>
<td>East Flanders</td>
<td>135,489</td>
<td>3,708</td>
</tr>
<tr>
<td>Hainaut</td>
<td>125,774</td>
<td>11,571</td>
</tr>
<tr>
<td>Liège</td>
<td>114,179</td>
<td>13,150</td>
</tr>
<tr>
<td>Limburg</td>
<td>75,725</td>
<td>5,383</td>
</tr>
<tr>
<td>Luxemburg</td>
<td>69,553</td>
<td>5,629</td>
</tr>
<tr>
<td>Namur</td>
<td>67,813</td>
<td>10,152</td>
</tr>
<tr>
<td>Belgium</td>
<td>964,914</td>
<td>66,405</td>
</tr>
</tbody>
</table>

Source: Agriculture. Récensement général de 1910.

Thus at the eve of WWI the dairy sector in Belgium consisted of a developing co-operative sector, a smaller but not insignificant private sector, and a well developed segment of home processing. The industrial census held in 1910 counts 528 creameries in Belgium with a majority of 301 hand powered creameries and a resulting 227 using steam power. These steam powered creameries were the largest ones, employing 1,178 people, while the hand powered had 873 employees.

WW I was a painful matter for the Belgian population and its industry and had certainly also an enormous impact on the dairy sector. Its livestock was hit particularly hard. Belgian livestock was decimated during the war due to war activities at the front, German claims on more than 700,000 cattle, and an epidemic of foot and claw disease in 1916 (Niesten, Raymaekers & Segers, 2002, 12). Moreover the quality of the remaining livestock was deplorable, since there was a large shortage of good feedstuffs. A lot of equipment of the creameries had been removed or destroyed. Especially in the province of West-Flanders, close to the front, destruction was heavy. Even more important, the Germans introduced price restrictions for butter and to the end of the war also compelled milk deliveries by the farmers to the creameries in an attempt to avoid shortages and curb the black market. Many farmers left the co-operatives when the official butter trade of the creameries became submitted to price restrictions. Those farmers could get higher prices at the black market. Due to the shortage, prices became less responsive to the quality of the butter. The price restrictions furthermore tended undervalue the higher quality of creamery butter. This opened possibilities to the farmers who sold their butter outside of the

controlled segment of the market where the creameries operated. Butter traders and whole sale buyers who went directly to the farms to obtain their butter supplies became a lot less critical as to the quality of these products.

At the end of the war the dairy industry in Belgium was shattered. Farmers had less cows of lower quality at their disposal. Somewhere between 30 and 40 per cent of the cattle appeared to be lost (Mommens, 1985, 22). Many of the creameries were closed, or had lost a lot of their machinery. Statistical time series about the number of creameries during the Interwar Years are not available, yet all sources signal a significant decline. According to contemporary estimates, at least 25 per cent of the creameries were lost during the war. Those creameries that were still in operation, struggled with abandoning suppliers. The post-war government used similar measures as the German occupiers. This made the farmers again wary of compelled deliveries to the creameries. Post-war scarcity ensured high prices and the price restrictions could be evaded through black market operations. Farm processing was even more strengthened by the growth of liquid milk consumption which made milk traders from the cities go further into the countryside for their supplies. The quality of the cattle was restored rather quickly through mass imports of foreign foodstuffs, and many cows were transported from Germany as a part of war compensations. A ban on slaughtering animals finally also contributed to an increase by 35 per cent of cattle in Belgium between 1919 and 1921 (Lefebvre & Segers, 2003, 490). Restoring the appeal of the co-operative creameries however, proved to be harder. The co-operative spirit had suffered under these events. It is argued that in this period the Belgian co-operative dairy industry suffered from an important delay compared to the traditional dairy countries which became very difficult to catch up to (De Baere, 1971, 32). However, from 1919 onwards farmers associations such as Boerenbond set up big campaigns promoting co-operative creameries with the farmers. In the 1920s we can see a slow revival of the co-operative creameries. Favourable market conditions during the 1920s helped the dairy sector and the co-operative creameries to recover somewhat from the problems of WWI. There was in the 1920s, especially between 1924 and 1929 a careful beginning of the merging of smaller hand-powered creameries into larger steam powered ones (De Baere, 1971, 33). The industrial census of 1930 counts 399 creameries, 275 steam powered and 125 hand powered.

The Great Depression hampered the revival of the dairy industry in the 1930s. However, despite the economic crisis which affected purchasing power negatively, butter consumption per capita held more than its ground.

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7 Archive KADOC KU LEUVEN, Boerenbond Hoofdbestuur. Dossier zuivelconsulentschap 7.2.3.3 (1).
8 Recensement de l'industrie et du commerce (31 décembre 1930), Brussel, 1931.
Table 3. Butter consumption (kg.) per capita in Belgium during the Interwar Years

<table>
<thead>
<tr>
<th>Year</th>
<th>Consumption (kg.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1920</td>
<td>7.16</td>
</tr>
<tr>
<td>1921</td>
<td>7.64</td>
</tr>
<tr>
<td>1922</td>
<td>9.03</td>
</tr>
<tr>
<td>1923</td>
<td>8.1</td>
</tr>
<tr>
<td>1924</td>
<td>7.65</td>
</tr>
<tr>
<td>1925</td>
<td>7.74</td>
</tr>
<tr>
<td>1926</td>
<td>7.56</td>
</tr>
<tr>
<td>1927</td>
<td>7.47</td>
</tr>
<tr>
<td>1928</td>
<td>7.56</td>
</tr>
<tr>
<td>1929</td>
<td>8.2</td>
</tr>
<tr>
<td>1930</td>
<td>8.97</td>
</tr>
<tr>
<td>1931</td>
<td>10.35</td>
</tr>
<tr>
<td>1932</td>
<td>11.02</td>
</tr>
<tr>
<td>1933</td>
<td>10.34</td>
</tr>
<tr>
<td>1934</td>
<td>10.36</td>
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<td>10.33</td>
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<td>1936</td>
<td>10.49</td>
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<tr>
<td>1937</td>
<td>10.23</td>
</tr>
<tr>
<td>1938</td>
<td>10.08</td>
</tr>
<tr>
<td>1939</td>
<td>9.26</td>
</tr>
</tbody>
</table>

Source: Annuaire statistique

Still, for the first time talk of growing overproduction is heard (Mommens, 1985, 144). It becomes ever more difficult for butter traders to secure their markets. Statistical data modify this view of overproduction somewhat. The Belgian butter production shows a gradual increase during the Interwar Years. Butter consumption almost always exceeded Belgian production and even increased quiet rapidly after the onset of the depression. After 1933 consumption topped off a little but remained more or less on a plateau, without collapsing. Real butter prices decreased at the same time of the rise of consumption in the beginning of the depression cancelling each other out to a large extent. After that they stabilized until the beginning of WWII.

Graph 2. Belgian butter production and consumption (kg.) during the Interwar Years

Source: Cools (1938, 321-348)
Remarkable however, is the evolution of the net exports of butter during these years. Shortly after Belgium became a net exporter for the first time in the 20th century, the balance deteriorated quickly. The onset of the Great Depression came with very large increases of imported butter from abroad, which eventually led to protectionist measures, starting in 1932, to guard the Belgian butter market from foreign competitors. This gives a more specific view to the vague complaint of overproduction. The large import shows that the Belgian dairy industry was probably operating less efficiently than the competition from abroad, which in some case of course also may have been helped by export subsidies. It was not so much domestic overproduction but foreign competition which put a strain on the Belgian butter producers in the beginning of the 1930s. The international butter market showed decreasing prices because of growing competition of the southern hemisphere producers. To counteract the decreasing real prices of butter further, there was a cautious tendency towards increasing quality of the dairy products.
All in all we can still conclude that the dairy industry weathered the crisis relatively well. There was a modest return to the creameries by some suppliers that were also struck by the crisis (De Baere, 1971, 74). The quota protected the domestic industry against foreign competition but also attracted new producers from other agrarian sectors which did not have sufficient protection. Some further concentration in the dairy sector ensued. In 1937 315 of the active creameries were steam powered and only 128 remained manually driven⁹. This was a first sign for the restructuring of the sector that was highly needed and took place during WWII.

### 6 Weaknesses of the Belgian Co-operatives

Critical evaluations of the Belgian co-operative dairy sector before 1940 differ. Most authors seem to have a rather positive of neutral judgment (De Baere, 1971) about the quality and efficiency of the sector. Lefebvre and Segers (2003) however are highly critical of the economic performance of the co-operative dairy sector especially during the Interwar Years. This makes it very interesting to give an evaluation of the successes and failures of the Belgian co-operative dairy industry, particularly when they are compared to the international benchmarks.

Statistical data, especially on the private dairy sector, are very scarce for the beginning of the creamery system. However the sparse statistics that are available give a solid impression that

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the private creameries did not disappear at all in the Belgian dairy sector. This is remarkable since it is in contradiction to the theory of the transaction cost approach formulated around the creameries and also with the empirical validation of this theory in successful dairy countries such as Denmark or the Netherlands. In Denmark the private creamery sector appeared dissipate almost completely rather quickly after the establishment of the first creameries. In not much more than a decade after the first co-operative creamery was set up, the share of the private creameries in industrial dairy processing seems to have sunk to 20 per cent or less (Hviid, 2001, 1). In 1909 their share is around 14 per cent and decreasing further (Henriksen & Hviid, 2002, 17). The share is even lower when one considers the fact that private creameries were usually smaller than their co-operative counterparts (Henriksen, 1999, 70). Something comparable happened in the Netherlands. Co-operatives quickly dominated the market in the butter producing areas, even in Friesland, known for its large estates (Van Zanden, 1985, 263-273). At the end of the 1930s co-operative creameries produced more than 80 per cent of all butter in the Netherlands (Bieleman, 1992, 222). In Belgium on the other hand the private creamery sector was estimated to consist of about one third of the industrial dairy sector at the end of the nineteenth century (Lefebvre & Segers, 2003, 489-490, 493-493). A few decades later, in the 1930s the number of private creameries seemed to have risen towards roughly 45 per cent of the total creameries. Around 1940 this number increased further to 55 per cent and more of the industrial dairy production (De Winter & Tambuyzer, 1956, 425). These numbers are probably even an overestimation of the number of ‘real’ co-operatives, since most of the time so called industrial co-operatives were also counted as co-operatives. Another fact pointing in the same direction is the remarkable strength of home processing. The large majority of the milk processing was still being done at home (Niesten, Raymaekers & Segers, 2002, 9). With the large scale introduction of the home cream separator in the beginning of the twentieth century this tendency was even given an extra stimulus. This means that after the initial enthusiasm for the co-operative business form there arose quickly some kind of counter tendency towards individualism. Around 1900 only 22 per cent of all butter was produced in creameries and almost forty years later this had only increased to around 40 per cent, this in stark contrast to the more successful dairy countries (Lenaert, 1939, 83). The fact that after the introduction of the co-operative creamery in Belgium private creameries did not disappear but even increased their share in the long term, with something comparable happening with home processing, might unveil that there were indeed some difficulties with the co-operatives preventing them from operating under optimal conditions. If we compare the size of the average creamery in Belgium with their counterparts in the Netherlands and Denmark, remarkable differences can be seen. In the 1930s the average daily milk supplies for Belgian creameries is estimated at 4,750l, while in
Denmark this was around 11,200l and in the Netherlands 14,000l on average. Neither could Belgian butter reach the same quality as the foreign products (Lenaert, 1939, 84). This inefficient production and general quality of butter was also demonstrated by the fact that Belgium remained a net importer for butter, throughout almost the whole period between 1890 and 1940, despite the importance of butter production in Belgian agriculture. Only in 1927 and 1928 the trade balance for butter was slightly positive.

There is indeed within the sources and literature concerning the Belgian dairy industry some evidence that points to substantial malfunctioning of a considerable part of the co-operative sector. Especially Lefebvre and Segers (2003) convincingly show that during the interwar years, the co-operative dairy sector struggled with many problems. They conclude that the problems the co-operatives were facing were basically sharp mutual competition, severe undercapitalization and poor knowhow. These are undoubtedly true, but the question remains why these problems continued, and were not solved by the co-operative creameries. Competition between the co-operative creameries was effectively muted in Denmark, and after a while also mostly in the Netherlands. Raising enough capital would not have been impossible either, even when the farmers themselves owned only small farms and were not particularly wealthy. Credit would have been available when needed. Farmers’ funds and banks and especially credit co-operatives organized by Boerenbond and based on the German example of Raiffeisen (Van Molle, 1990, 78-82) were available to provide the necessary credit. These banks were continually in search of investment projects in the agricultural sector and even most of the time also very lenient in their granting of credit and with the repayments of the loans. After all they often did not only serve an economic, but also a social and even political goal. Finally, there was also potentially enough knowhow present in Belgium. Dairy education was available and there were magazines for spreading knowledge about farming and dairy practices. Well functioning co-operatives could hire a manager with the needed knowhow to run a co-operative properly.

To shed some light on this puzzle we should start with taking a deeper look at what exactly made the Belgian co-operative creamery sector unhealthy. First of all most co-operatives were too small. There were definitely unrealized economies of scale; certainly the smaller ones were operating under minimum efficient scale of production. The bigger creameries operated consistently at a lower average cost compared to the smaller ones. The dairy department of Boerenbond estimated the following operational costs for Belgian creameries in the 1930s.

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11 Archive KADOC KU LEUVEN BB-M Londerzeel. Letter from Dreessen March 26 1935.
Table 4. Operational Costs of Belgian creameries

<table>
<thead>
<tr>
<th>Creamery type</th>
<th>Processing costs per litre of milk</th>
</tr>
</thead>
<tbody>
<tr>
<td>6,000 l a day</td>
<td>0.2 BEF</td>
</tr>
<tr>
<td>8,000 l a day</td>
<td>0.1 BEF</td>
</tr>
<tr>
<td>31,000 l a day</td>
<td>0.07 BEF</td>
</tr>
</tbody>
</table>

These existing economies of scale for these small creameries led in some regions to heavy competition for suppliers, not only between co-operatives and private creameries, but also between co-operative creameries. This competition stimulated suppliers to leave or switch easily between creameries when higher prices were offered in other places. Co-operative creameries were furthermore, because of this competitive environment, inclined to accept milk of non-members. After a while this even became the habit in most co-operatives. Some co-operative creameries were even willing to accept ‘bad’ suppliers that were refused elsewhere, because of adulteration or low quality milk. This competition for suppliers was not only used to capture scale effects, depriving the surrounding creameries of their suppliers also weakened them (Lefebvre & Segers, 2003, 503-506). In spite of these economies of scale investment in the creameries was generally very low and in many instances the equipment was outdated. Farmers were not inclined to invest more in the creameries but expected immediate returns. Instead of withholding part of the profits of the creameries for investment, farmers consistently demanded the highest possible prices for their milk supplies (Lefebvre & Segers, 2003, 507, 527). It also appeared that often the initial start-up capital was too low (Lefebvre & Segers, 499, 518). This problem can possibly be seen as a lack of commitment from the part of the farmers. The tendency to demand the highest possible prices at any time for the milk supplies points in the same direction. All were symptoms of myopia implying that the farmers applied a very limited time horizon. Neither is the apparent unwillingness to make easy switching between creameries hard or impossible for other farmers (and therefore also for themselves) a sign of high commitment or involvement with the co-operative. Many of the co-operatives also were, or transformed in time to so called industrial co-operatives. In these institutions the capital of the co-operative was owned by a limited number of farmers who used the co-operative for the processing of the milk, controlled it and split the dividends among them. However they also had an important number of milk suppliers who were not members. In that way it was acting as a kind of co-operative for the members, but was much more behaving like a private creamery towards many other suppliers (De Winter & Tambuyzer, 1956, 413). Legally all these firms were co-operatives but theoretically and practically they were operating as private firms (Mommens, 1985, 38). Around the 1930s only few suppliers of the co-operatives still became actual members (Lefebvre & Segers, 2003, 507). Finally there were difficulties in handling with defection of the members and suppliers. This summarizes all the problems that were related to some kind of unco-operative behaviour. This could be members leaving the co-operative or other problems
with bad and untrustworthy suppliers (Lefebvre & Segers, 2003, 506). There was the problem of 
adulteration, and often there were complaints from the creameries about the low quality of the 
suppliers’ milk in general. These suppliers usually had little trust in the analyses of the milk 
made by the co-operative creameries (De Baere, 1971, 28). To make the controls believable, 	enough higher instances such as Boerenbond had to be contacted, making these controls more 
costly and time consuming12.

All in all, even more when considering survivor bias in the sources; the most malfunctioning 
creameries existed only for a short while and left relatively little traces in the archives, this 
seems to paint a relatively bleak picture for the co-operative creameries in Belgium. Many of the 
problems the co-operatives face resemble exactly the theoretical problems that private 
creameries should be struggling with. However, according to the theory, the typical co-
operatives should have been ideally placed to deal exactly with the problems they seem to be 
confronted with in the Belgian case and should have been outperforming the private sector and 
also the farmers processing the milk at home. Home processing was in theory a less cost efficient 
means of processing butter, so it could only survive because of some kind of failure within the 
co-operative sector which normally should offer the farmer prices that were a lot higher than in 
home processing13. Thus, one is tempted to think that Belgian co-operative creameries could 
somehow not capitalize all the advantages which made co-operatives in the beginning of the 
twentieth century a more efficient corporate organization for the dairy industry. The methods 
co-operative organizations used to tackle these problems were not used sufficiently or were 
somehow inadequate. We should therefore attempt to form a hypothesis on why these methods 
were not used, or failed.

7 Belgian Co-operative Weakness: A Matter of Trust?

To start looking for an explanation of the weaker performance of the Belgian dairy co-
operatives, it may be interesting to once again invoke the international reference countries. 
Denmark was the international benchmark; co-operatives were really successful there, as were 
the co-operatives in parts of the Netherlands. Ireland however is a different case. There co-
operatives seemed to be struggling just as hard or even harder with the same problems as in 
Belgium (McCabe, 1906, 555-564). Farmers were unwilling or unable to punish defecting 
members, like in Belgium the industrial co-operative form was widespread and often competition 
between co-operatives was high. Similar problems were found in other forms of cooperation

12 Archive KADOC KU LEUVEN, Boerenbond Hoofdbestuur. Dossier zuivelconsulentschap 7.2.3.3 (1). 
13 Cf infra., In Ireland for example creamery butter fetched 16 per cent more than farmers’ butter. 
(O’Rourke, 2001, 5)
between the farmers (Guinnane, 1994, 56). Cooperatives didn't dominate the industrial market since private creameries kept an important share of production. Finally, home production remained also in Ireland the dominant form of dairy processing. Many reasons were given for the relative failure of Irish cooperation. Some of them ranged from lethargy of the Irish farmers (McCabe, 1906, 562) to the inability of Catholic cultures to cooperate.

O'Rourke (2001, 2004, 2007a) offers another explanation for the Irish co-operative failure. According to him, it was mostly the political situation that was responsible for the low propensity to cooperate (O'Rourke, 2007a, 1375). Distrust between different groups within the society, such as Catholics and Protestants or tenants and landlords, aggravated by political questions like the Land Wars, led to lower social cohesion (O'Rourke, 2004, 27). This caused the absence of a co-operative spirit in Ireland and hampered the further spread and the existence of the dairy co-operatives. Denmark on the other hand enjoyed large ethnical, religious and linguistic homogeneity among its population making the farmer able to 'identify with one another' (Henriksen, 1999, 60) which was often credited for the country's large propensity to cooperate (Kindleberger, 1951, 40, 45). The question remains whether the analysis of the Irish case has any explanatory value for what happened in Belgium. But since the problems the cooperatives had to face seem to have been more or less the same in both countries, the Irish analysis may well prove a good starting point in finding an explanation for Belgium.

7.1 The ‘Dismal Decennia’ of Belgian Dairy Co-operatives

It is clear that the number of active co-operative creameries in Belgium began to stabilize around the beginning of the twentieth century. This is not a first wave of concentration however because we can see the same tendency, even more pronounced in the average number of members per co-operative creamery. After a steady rise until the turn of the century, this number decreased with almost 13 per cent between 1900 and 1912.
This is more remarkable in the knowledge that other forms of cooperation between farmers such as purchase co-operatives or credit co-operatives which were founded around the same period and followed up until then more or less the same path, kept growing during this period (Van Molle, 1989, 400). Seeing these figures of a stabilizing co-operative sector consisting of many small co-operatives, one is tempted to attribute this to the market for creameries being saturated i.e. the co-operatives running out of suppliers. Against the size of the market and of the co-operative creameries the endogeneity argument can be brought forward again. When the creameries would perform very well, farmers would be willing to invest more in the quality and the size of their herd. In Denmark for example the number of milch cows owned by farmers increased with 21 per cent between 1880 and 1900 (Henriksen, 1999, 70). In the Netherlands there was the same tendency. In Drenthe, one of the important provinces for co-operative creameries, the number of milch cows increased with 155 per cent between 1880 and 1939 (Bieleman, 2003, 33). In Belgium this growth was less impressive. While the number of milch cows increased with 24 per cent between 1880 and 1910, the number of cows owned on average by co-operative members remained relatively stable from the end of the nineteenth century onwards.

14 These data, during the Interwar Years concern the cooperatives that were affiliated with Boerenbond or the Ligue Luxembourgeoise, and thus they are not complete. However, these two organizations comprised most of the important cooperatives, so we assume they can at least serve as a good indication for the actual developments.
However, even more important is the fact that there remained a large unrealized potential of suppliers for the creameries. Only a small percentage of the dairy farmers supplied regularly to the creameries.

Table 5. number of cows in co-operative creameries in Belgium per province in 1910

<table>
<thead>
<tr>
<th>Province</th>
<th>Milking cows</th>
<th>Cows in co-operative creameries</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antwerp</td>
<td>104,305</td>
<td>16,981</td>
<td>16.28%</td>
</tr>
<tr>
<td>Brabant</td>
<td>135,624</td>
<td>18,870</td>
<td>13.91%</td>
</tr>
<tr>
<td>West Flanders</td>
<td>136,452</td>
<td>28,202</td>
<td>20.67%</td>
</tr>
<tr>
<td>East Flanders</td>
<td>135,489</td>
<td>16,479</td>
<td>12.16%</td>
</tr>
<tr>
<td>Hainaut</td>
<td>125,774</td>
<td>11,390</td>
<td>9.06%</td>
</tr>
<tr>
<td>Liège</td>
<td>114,179</td>
<td>7,030</td>
<td>6.16%</td>
</tr>
<tr>
<td>Limburg</td>
<td>75,725</td>
<td>22,972</td>
<td>30.34%</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>69,553</td>
<td>37,883</td>
<td>54.47%</td>
</tr>
<tr>
<td>Namur</td>
<td>67,813</td>
<td>3,043</td>
<td>4.49%</td>
</tr>
<tr>
<td>Belgium</td>
<td>964,914</td>
<td>162,850</td>
<td>16.88%</td>
</tr>
</tbody>
</table>


For the whole country in 1910 the milk of less than 17 per cent of all milch cows was supplied to the co-operatives. Even the most successful co-operative dairy province at the time, Luxemburg, the co-operatives could attract little more than 50 per cent of their potential.

The return to home processing with the introduction of the home separators can be pointed to as a culprit for this stagnation in the development of the co-operative creameries during the first decade of the twentieth century. It might be interesting to make a comparison with
simultaneous developments in the Netherlands. Dekker pointed out the differences between these two neighboring countries (Dekker, 1996, 106-107). In the Netherlands a first wave of concentration took place from 1900 onwards with smaller sometimes hand powered creameries disappearing or merging into larger steam powered ones. This process was almost finished around 1915 when pasteurization became compulsory, giving the final blow to the few remaining hand powered creameries. Also in Dutch Limburg, bordering to the Belgian province of the same name, these developments were very distinct. These provinces on both sides of the border had comparable natural and agrarian conditions and also the dairy industry was remarkably similar until 1900. Both showed a very dense presence of small hand powered creameries compared to the rest of their respective countries. From then onwards the share of hand powered creameries diminished rapidly in the Dutch province while a few kilometers further across the border the development stagnated, the number of hand powered creameries remained high well into the Interwar Years, and many farmers retreated from the co-operatives. This is sometimes blamed to rising butter prices prompting farmers to retreat from the creamery and invest in home separators (Niesten, Raymaekers & Segers, 2002, 12; Dekker, 1996, 107). If we look at butter prices we see indeed a rise after 1900 in Belgium.

Graph 7. Butter prices (BEF) in Belgium between 1883 and 1913

![Graph 7. Butter prices (BEF) in Belgium between 1883 and 1913](image)

Source: Vandendael (1938)

However, looking at the evolution in the Netherlands one can see an almost similar development. In both countries butter prices rose somewhat less than 20 per cent during the first decade of the twentieth century, apparently leading to quite contrary results (Wintermans, 1944, 465). Furthermore, since the activity of the creameries was also producing and selling butter, rising prices also applied for them, and could thus just as well be seen as a potential
benefit for the creameries. This means that rising butter prices alone are not sufficient to explain the tendency away from the creameries.

Regardless of the issue of rising butter prices the return to home processing remained odd. After all, home separators might be better than the old ways of skimming milk and producing butter on the farms, they were still less efficient than the production process in the creameries. First of all a home separator remained a considerable investment for most farmers. Farmers who resorted to home processing lost the economies of scale in production and marketing that were offered by the creameries. Most home separators did not function as well as the equipment on the creameries, which resulted in a considerable loss of butterfat. It is estimated that around the beginning of the twentieth century in the creameries on average 28 liters of milk were needed to produce a kilogram of butter. The farms needed at that time around 30 liters to produce the same amount. This makes them 7 per cent less efficient than the creameries at that time in skimming milk. It took until the mid 1930s for home processing to become as efficient as the creameries were in 1900 (Blomme, 1992, 141-142). There were other technical difficulties associated with home processing of butter. Often preconditions of proper hygiene were not met as well as with the creameries. Shelf life for farm made butter for example was usually lower than that of creamery butter. Partly because of this the obtained prices for farm butter were correspondingly lower. Comparing butter prices in Belgium is difficult since farm butter was quoted in retail prices and creamery butter most of the time in wholesale prices. For some period in the 1930s we do have retail prices of creamery butter enabling some comparison. Creamery butter at that time fetched a price that was on average 7.5 per cent higher than that of farm butter (Mommens, 1985, 165).

It is certain that in the first decade of the twentieth century the co-operatives could count noticeably less on the loyalty of their suppliers. Sometimes the co-operatives even used more unorthodox methods like press campaigns trying to keep suppliers from abandoning (Van Duffel, 1983, 119). Apparently they were mostly unsuccessful in their attempts. The intrinsic causes for this abandonment are less clear though. Intensive marketing campaigns of the producers of home separators definitely played a part (Niesten, Raymaekers & Segers, 2002, 12). The fact that the co-operative movement was more of a top down movement, heavily promoted by Boerenbond and less of a bottom up movement really originating from farmers, compared to for example Denmark, might sometimes have played against the co-operatives, making the suppliers feeling less attachment to them. In some towns or regions political divides could have had some influence, since the co-operatives were associated with the catholic party while private
creameries were seen as part of the liberal pillar\textsuperscript{15} (Niesten, Raymaekers & Segers, 2002, 11, 52; De Baere, 1971, 24; Vannoppen, 1984, 463-475). Home processing made the farmers also more independent and freed them from any possible obligations, such as investments and quality precautions, dangers, like adulteration of other members or diseases spreading through the pooling of milk, and other costs and perils associated with ownership. The skimmed milk for example was usually returned to the farmer as feedstuff for the animals, but left unpasteurized, which was often the case, it could potentially spread diseases like tuberculosis from one contaminated animal to the herds of many farmers.

Whatever the initial cause of this first withdrawal from the co-operative creameries, the timing was abominable to say the least. After all, this first episode was followed closely by WWI which, as mentioned above, proved to be absolutely devastating for the creameries and the dairy industry in general. Especially the price restrictions with resulting black market operations and the compelled deliveries further undermined the loyalty to the co-operatives\textsuperscript{16}. The first years after the war these practices continued while the interest for the creameries further diminished, making these times the heydays of home processing and the nadir of industrial production. At least 25 per cent of the creameries were lost. In 1921 the average co-operative only counted a bit more than 80 members, down from 115 around the turn of the century. It took until 1925, despite all the developments the international dairy sector, for the average co-operative to attain the same number of suppliers as in 1900. The increase in members per co-operative we see afterwards might have been partly caused by some recovery of the co-operatives but an important part is due to a concentration wave that took place against the end of the 1920s.

7.2 Commitment and Lock-in in the Belgian Dairy Co-operatives During the Interwar Years

The question is whether and how this dismal episode for the Belgian dairy industry also affected the performance of co-operative creameries during the Interwar Years? Could this period have had any relevance for or be linked to the documented problems of cutthroat competition, lack of commitment and defection the co-operatives struggled with during the Interwar Years? It is sometimes said that during this period co-operative spirit of the dairy farmers suffered (Mommens, 1985, 30-31). This is also in some way comparable to the problems that were noted in the Irish dairy sector. It might therefore shed light on the puzzle if we can concretize the vague complaint on this lack of co-operative spirit. The answer involves once again involves issues of trust and social capital, and more specifically a culture of trust. This culture of trust

\textsuperscript{15} Archive KADOC KU LEUVEN BB-M Steenhuffel Letter from Segers januari 24 1926.
\textsuperscript{16} Archive KADOC KU LEUVEN Boerenbond Hoofdbestuur. Dossier zuivelconsulentschap 7.2.3.3 (1)
means that the majority of participants, in this case, the farmers, will expect that other parties, the other farmers and the co-operative, will not defect, but that they will for example choose the co-operative decision, instead of opting for quick but shortsighted profits, even when it is hard to monitor intentions or all transactions. For trust to arise certain preconditions have to be met. There has to be a suitable and credible punishment, financial or non-financial, for breaking agreements, to avoid that people wouldn’t have the right set of incentives to fulfill them. This implies that if there were no adequate punishment people would understand the lack of incentives and, using backward induction, would ex ante not transact with each other (Dasgupta, 2002, 9-10).

O’Rourke explains how the initial shift towards co-operatives can have a *snowball effect* on the establishment of other co-operatives in the region (O’Rourke, 2007a, 1366). It is easier as a creamery to keep the commitment only to accept milk from members and to promise credibly to punish or exclude bad suppliers when other co-operatives commit to the same. Competition for suppliers between the different co-operatives is thus in fact wiped out, and bad suppliers will have a very hard time finding a new creamery. It is also easier to gain trust and thus commitment from potential suppliers to invest in co-operatives when they observe the stability of the system, notice that their peers are joining and see networks forming. This can ensure a rapid transformation to co-operative organization, as it did for example in Denmark. However, when the right conditions were not met, the snowball might roll the other way, as it probably did in Belgium during the first decades of the twentieth century. If people only join sparsely, or for some reason suppliers start leaving a co-operative, this can also give way to a positive feedback loop strengthening this existing tendency into a negative spiral. In extreme cases this could even result in a run on the co-operative, with exits induced by previous exits. It is well documented in economic literature how exactly these initial strengths of the co-operatives, the concomitant sharing of fixed costs and investments, can become their weakness if trust somehow breaks down (Rey & Tirole, 2000). As specified in the transaction costs approach, a negative spiral among their supplies is exactly one of the most important pitfalls that co-operative organizations tried to tackle by their methods to curb defection to ensure a regular milk supply. When the farmers see a substantial number of other suppliers leaving, like they often did in the Belgian dairy co-operatives during these first decennia of the twentieth century, they realize that the credibility of punishment for defection is affected. Fixed costs for the co-operative rise and the incentives for other suppliers to do the same thing increase. Their trust in the co-operatives and the co-members diminishes, causing them to commit less. Farmers that were not yet members will also be more reluctant to join a co-operative. After all, the risks of ownership for the farmers increased considerably. At least the insecurity will make farmers less willing to
make large investments when establishing a co-operative or maintaining the equipment in a modern state\textsuperscript{17}. They will instead expect higher immediate returns and consistently demanding the highest prices for their supplies and be less concerned with increasing efficiency and thus returns on the long term. Imposing strict rules furthermore, on punishing everyone who breaks their commitment to the co-operative is very beneficial for economic performance, and thus for the farmers individually, however only so when commitment of other farmers could be expected as well. If insecurity about the stability of the co-operative is larger, farmers would be more inclined to remain flexible and not lock themselves in to the co-operative, which would become a drag to them if many other members would still defect. The same applies of course to investing your money in a co-operative. This again makes defection for suppliers easier, completing the spiral. Increasing defection from a co-operative also had its effects on the social sanction accompanying these actions, which constituted normally an important part of the punishment. The more it happened however, the less badly leaving the co-operative will probably have been looked at. After all when defection rose it would have become more socially acceptable to do so. The increasing number of defecting farmers would have made social ostracism less of an option. This acted once again as a kind of snowball effect.

In Belgium in the beginning of the twentieth century people indeed started to leave the co-operative creameries, mostly in favour of home processing. At the same time networks for the sale of farm butter began to grow. Local and regional markets used by the farmers grew and wholesalers called ‘ramasseurs’ came to the countryside to collect the butter at the farms (Lenaert, 1939, 152-153). With the strengthening of this tendency of abandonment of the co-operatives during WWI, it is easy to conceive this kind of snowball effect happening. Co-operatives were during this episode apparently unwilling or unable to punish these defecting suppliers sufficiently and stop this process even though this put their own existence in peril (Vanduffel, 1983, 119). The distrust of the farmers towards the co-operative creameries was probably even reinforced by the fact that it took often long time to liquidate the remains of the co-operatives and regain some of the initial investments once they had been put out of business after the war time (Mommens, 1985, 30). This lack of commitment to the co-operatives and distrust towards them is the realization of this so called suffering co-operative spirit. The effects of this situation are easily conceivable when we take the transaction costs approach in consideration. While in well functioning co-operatives both the co-operative and the suppliers have each other mutually locked in thereby impeding opportunistic behaviour from both sides, malfunctioning co-operatives face the danger of being locked-in without countervailing power. In

\footnotesize{\textsuperscript{17} See for example Archives KADOC KULEUVEN BB-M Sint-Anna Opwijk report consultant Segers may 24th 1930.}
this way they are left competing for the suppliers for example by offering higher prices. The consequence of this one sided lock-in is that co-operatives will at large struggle with the same problems as private creameries did.

This is what could be observed in Belgium and contributed to the weaknesses Lefebvre and Segers (2003) noted. Owing to a large extent to this lack of commitment and interest for the co-operative creameries, starting in the beginning of the twentieth century, Belgian co-operative creameries were generally too small. Combined with their lack to assure themselves of suppliers, they remained often in uncertainty about attaining enough regular milk supplies. With regards to the existing economies of scale it’s easy to conceive this caused the heavy competition between creameries that could be observed in some regions during the Interwar Years, which made creameries struggle to obtain each others suppliers, even bad suppliers that could have been refused elsewhere (Lenaert, 1939, 95, 116). Milk suppliers were motivated to deliver their milk where prevailing prices were highest. This lack of loyalty and the uncertainty about the milk supplies on its turn suppressed the co-operative’s means to deal with adulterated and low quality milk, as it did with the private creameries. Adulterating members were often simply able to switch co-operatives and defecting or leaving the co-operative early was a lot less costly when investment was low and options were available. Usually milk from non-members was accepted as well. Thus the so called industrial co-operatives, where accepting milk from non-members was the standard, became a widespread fact loosening the ties between suppliers and co-operatives further18. An example of these rather loose ties between the suppliers and the co-operatives can be found in the milk strikes that took place towards the end of the 1930s. When the input costs for dairy production increased due to a devaluation of the Belgian currency in 1935, while the received milk prices remained stable, many farmers went on strike in 1936, refusing to supply the co-operatives. Some of the private creameries ironically escaped, when they could call upon contracts with the farmers (Mommens, 1985, 98). In 1938 there was a new wave of strikes around the country. If one assumes close ties between the suppliers and the co-operatives it would be strange for them to decide to strike against the co-operatives which they theoretically owned themselves. Another fact contributing to the alienation of the suppliers from the co-operatives was that often these creameries maintained contracts with the milk carriers that collected the milk from the suppliers, making this milk carrier the main contact rather than the co-operative itself. When these milk carriers switched between creameries, all of his suppliers followed suit19 (Lefebvre & Segers, 2003, 506). These problems of competition and defection were of course interrelated with the previously mentioned lack of commitment and investment. In short, decreased loyalty and commitment made the basis of supplies for the co-

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19 For example: Archives KADOC KULEUVEN BB-M Londerzeel. Letter by M Delcourte november 28th 1938.
operatives small and thus induced competition between the different creameries, which on its turn decreased to incentives to commitment and investment in the co-operatives and on the contrary spawned a form of myopia, with a too strong focus on short term benefits. When the investment of the members in the co-operative was generally low, the potential penalty for unco-operative behaviour was correspondingly lower, while the cost for the co-operatives, because of the competition and the insecure milk supply, would be higher. This naturally affected the credibility of the penalty for defective behaviour, such as premature exit out of the co-operative and adulteration, and equally the occurrence of this behaviour. The co-operatives in general did therefore not succeed in locking in their suppliers which could have led to a stable relationship between both and a steady development of the sector. This contributed to the problems that were observed in the Interwar Years.

8 Conclusion

An assessment of the Belgian dairy industry before WWII showed a few things. First, the share of industrial butter production remained remarkably low during this period despite the substantial economies of scale in production and marketing this kind of organization had to offer. Still at the beginning of WWII creameries were only responsible for around 40 per cent of the total Belgian butter production, which of course affected the overall quality of the Belgian butter. Second, although statistical data were scarce estimates seem to imply that within the sector of industrial processing, the share of private creameries to their co-operative counterparts remained relatively high throughout this whole period and seemed to have hovered between 30 and 45 per cent. This is remarkable since in successful dairy countries for this period such as Denmark and the Netherlands industrial production broke through quickly and often almost completely. Moreover, in these flourishing regions dairy processing showed invariably a strong to full domination by co-operative creameries. This is no coincidence since according to the transaction costs approach co-operatives were better suited do deal with the problems they faced posed by the specific organization and technology of the time. This fact is widely acknowledged by present-day scholars, but also by many people that were at the time involved in dairy processing. Belgium is in this occasion more comparable to the Irish case where this domination of industrial production and of co-operative organization was far from complete. As in Ireland we may therefore assume that the relative lack of development and backwardness of industrial dairy processing might at least have been influenced by weaknesses within this co-operative organization. The weaknesses the co-operative creameries faced, some of which presumably also hampered the private enterprises, were mostly interrelated. They could be summed up as a lack of commitment by the suppliers, which includes too little investment and the establishment of industrial co-operatives, sharp mutual competition, intensified by the co-operatives being too small and the matters involving defective behaviour. These weaknesses revealed that co-
operative creameries in Belgium somehow did not, or not completely, succeed in taking advantage of their specific organizational strengths which would have handed them the tools to overcome these problems of lock-in, caused by the organizational and technological circumstances of the sector. More specifically, the co-operatives failed at establishing a mutual lock-in with their suppliers, which would secure both a long term stable perspective. At the same time the co-operatives remained to some extent locked in by their suppliers who still had the opportunity to switch between different creameries or between industrial and home processing and often took this opportunity. We argued that not some inherent features of the Belgian society or its farmers had lead to a kind of inability to cooperate. Other forms of successful cooperation between Belgian farmers took place. A path dependant view where some historical events tipped the balance to the decline of trust and co-operative spirit in the dairy sector, according to complaints during the interwar years, might be more in order. Cracks in the co-operative organization began to show relatively quickly at the turn of the twentieth century. The dynamics behind it were not completely clear, although the large scale introduction and marketing of farm separators certainly played a part. This initial movement got a large impetus due to the events during WWI, which eroded trust of the farmers in co-operative dairy processing which is of paramount importance for the co-operatives to play out their competitive advantages. After all, this erosion of trust started a dynamic which diminished the attractiveness and binding power of the co-operatives, which at its turn contributed to the somewhat lacklustre performance of the Belgian dairy sector during the Interwar Years. Therefore it took longtime to restore some of this co-operative spirit and another ‘big event’ in the form of the reorganization of the dairy sector during WWII was needed to clear up most of the problems associated with industrial dairy processing in Belgium. Stating that up until WWII the co-operative movement in the dairy sector in Belgium was a complete failure, is a bridge too far. Co-operatives still attracted an important share of Belgian farmers; some of them were successful creameries, in some regions the co-operative systems worked pretty well. Co-operatives often had an important social and cultural function in the Belgian rural society. When one looks at the global economic picture however, the co-operative movement seems, after the initial enthusiasm for it, to have struggled with many problems and did not live up to its promises, certainly when compared with the developments in some other countries of the North Sea area.
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