

Financial and economic characterization of the major agri-food cooperative groups in the European Union.

Keywords: cooperative, demutualization, growth, conversion, transformation

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Abstract

Growth strategies of large agri-food cooperatives in the European Union (EU) are driving many of them into structures which are abandoning or relaxing their commitment to some of the cooperative principles, resulting in what has been called cooperative demutualization. In this paper we present the different structural growth models of cooperatives in the EU, from the study of the 20 largest cooperative groups in four sectors: dairy, meat, horticulture and supplies (80 in total), doing an economic and financial characterization of them, and comparing basically two groups of entities: on the one hand, entities which in their development have chosen, in order to raise funds and / or manage the cooperative, to create a business corporation (with more or less participation of the cooperative), and on the other hand, entities that have continued with the traditional model.

1.- Introduction and objectives

The cooperative form is very present in all economic sectors in the European Union (EU) and prominently in the food industry, being the agri-food cooperatives the most numerous, followed by construction, banking, trade, and insurance sectors of activities. Thus, in the EU-27 there are about 40,000 agricultural cooperatives which directly employ about 660,000 people and have an operating revenue of around 300,000 million Euros, representing over 60% of production, processing and marketing of agricultural products (COGECA, 2010).

Not surprisingly, the influence of agri-food cooperatives in their sector is recognized in both institutional and academic fields. Thus, European institutions recognize and identify them as structures capable of concentrating offer, rebalancing the role of producers in the food chain, increasing their bargaining power and giving more value to their products (Commission of the European Communities, 2009). Their ability to contribute to economic and social development in the different Member States and especially in those of recent addition (Commission of the European Communities, 2001) is also highlighted.

The agri-food industry in which they operate, is characterized by high price volatility (Committee on Agriculture and Rural Development, European Parliament, 2009), the growth of agricultural production costs, as a result of the increase in input prices, the consequent reduction in agricultural incomes and the increasing concentration of demand. Therefore, cooperatives have been adopting different business growth strategies, through formulas such as mergers and acquisitions, joint ventures, the creation of federated structures, etc., consolidating large cooperative groups in the EU.

In order to obtain larger dimension, major cooperative groups have adopted different organizational models such as:

- Cooperatives which maintain the traditional form, and have based their growth on mergers and acquisitions.
- Cooperatives which have based their growth on the creation of a federated structure, combined with an expansion process through mergers and acquisitions.
- Cooperatives which have chosen to create a business corporation, controlled to varying degree by the cooperative or their members, which can be listed or not. In some cases, this has allowed them to obtain the necessary funding for expansion and internationalization.

Some of these new organizational forms face conflicting aspects such as ownership rights, the creation of new financial instruments to attract investment, etc. (Holmström, 1999).

From a sample composed of the 80 major agri-food cooperative groups (in the meat, dairy, horticulture and supply sectors), and the analysis of their corporate information and financial statements, both drawn from the Amadeus database, this paper aims to:

1. Establish the different organizational growth models developed, from the analysis of their corporate structure.
2. Do an economic and financial analysis, and check (using statistical tools) if there are significant differences between the cooperatives included in each identified growth model, in areas such as business size, cost efficiency, and financial stability.

3. Analyze, differentially, two sets of entities: entities that have created business corporations (with more or less cooperative participation), for the purpose of managing the holding, to raise funds and / or managing the cooperative activity; and those who have kept traditional cooperative structure. The following hypotheses are going to be tested:
- H1. Cooperatives which have opted for the creation of a business corporation, have achieved a larger dimension.
 - H2. Cooperatives which have maintained their traditional cooperative structure, have achieved greater financial stability compared to those which have opted for the creation of business corporations.
 - H3. Cooperatives which have opted in their development for the creation of a capital society have achieved higher levels of cost efficiency and profitability.

The outline of this paper is as follows: Section 2 provides an overview of prior studies on cooperatives' growth models, conversions and new formulas of expansion. Section 3 describes our sample selection procedure, the different organizational growth models developed by each group and the methodology that has been used for the analysis. Section 4 presents the main results of our analysis. Section 5 summarizes the results and the limitations of the paper.

2.- Prior research.

O'Connor and Thompson (2001) highlighted that deregulation and the globalization of markets are changing business structures around the world by increasing the competitiveness of the business environment. These aspects have a higher impact on cooperatives than in other types of businesses, for several reasons. For example, cooperatives have usually been small and have had a local approach, they have often been protected from competition by regulations providing support for the farm sector, and they don't have usually paid high levels of salaries for senior managers, in contrast with other type of companies as business corporations, which get in many cases the most gifted executives.

According to Holmström (1999), cooperatives have traditionally developed where life has been more stable and where change may have still been less pressing. As it is pointed at his work: *'Cooperatives are much further removed from the watchful eyes of financial markets than business corporations. There are no stock prices to signal when change is necessary, nor active investors to drive through a painful restructuring.'*

Cooperatives are exploring new organizational forms. New Generation Cooperatives are a good example of how from the incorporation of innovative solutions in the model structure of the cooperative, highly competitive cooperatives can be created, without losing their cooperative identity. Moreover, it should be emphasized that these formulas are not definitive, since many of the cooperatives that implement them are facing the need of attracting additional capital (Holmström, 1999).

The reality is that from traditional cooperatives, to those which have opted for new formulas (sometimes the full demutualization), there are a variety of collaborative models. They integrate different elements such as external investors, corporations, listed or not, changes in profits allocation, etc.

There are some studies that analyze different structural models of cooperatives in their business growth. Bekkum and Bijman (2006), from the study of the evolution of 50 international cooperative groups, distinguished several types according to the innovations introduced in their cooperative ownership and how far they were from the classical cooperative form, focusing on the publicly listed cooperatives and distinguishing two groups:

- Cooperatives that converted into limited companies but nothing specifically 'cooperative' remained, with member shares detached from production, and allowed members to redeem their shares at their discretion, continuing a transaction

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relationship with the company or not. (Converted Listed Cooperatives – CLCs or converts).

- And cooperatives which have obtained public listing of their shares in the stock exchange for having access to external capital, but have maintained their cooperative identity. They could combine their cooperative objectives with the benefits of access to external capital. The authors called them: hybrid listed cooperatives (HLCs).

Nilsson (1999) identified different organizational models for European agricultural cooperatives:

- **Traditional Cooperatives:** where the main cooperative principles are reflected on them.
- **The participation cooperative model:** where there are two types of share capital, partner and investor. Investors, get paid their investment by interest or from the results, and may have no voting members in the organs of the cooperative, but the control of it is in the hands of the partners. In this organizational model is the cooperative which develops business.
- **The subsidiary cooperative model:** in which investors do not partner up. Thus, investors are part of the subsidiary, but not directly involved in the cooperative. The subsidiary is owned (wholly or partly) by the cooperative. The cooperative has control over the board of directors of the subsidiary company and the results of it are distributed to cooperative members (through the cooperative), and external partners, depending on their investment in the equity securities.
- **New Generation Cooperatives:** these cooperatives are not based in the entry of capital from new investors (although they may have been in the minority), but in new contributions from existing partners. In these cooperatives, non-members entry is free, but limited, and it is based on the acquisition of these rights to the cooperative supply (Harris, 1996), so that the capital contribution of each partner is proportional to the volume to be supplied to the cooperative. Thus, the distribution of income to the partners is proportional to the activity, but at the same time it is also investing in the cooperative partner. These cooperatives are highly professionalized, which requires high expenditures from shareholders for the acquisition of rights provision, which are transferable, and therefore are subject to revaluation. The voting rights are distributed equally among the partners, although it makes a weighting them according to the volume delivered by each partner.
- **The PLC¹ cooperative model:** They have created a business corporation, usually a PLC, for the development of the cooperative activity, becoming members of the cooperative partners of the company, though they remain members of the cooperative, which is not extinguished. The assets are transferred to the public limited company, distributing a portion of the shares among cooperative members, and in some cases the rest is brought to market. However, if the external participation at the PLC exceeds from 50%, the company should not be considered as a cooperative.

Coltrain *et al.* (2003) established the main differences between New Generation Cooperatives (NGCs) and Traditional Cooperatives (TCs), which were categorized in four groups: customer marketing transactions, patron profit distributions, owner investment obligations and *member* voting control. The major differences between TCs and NGCs highlighted by them were the following:

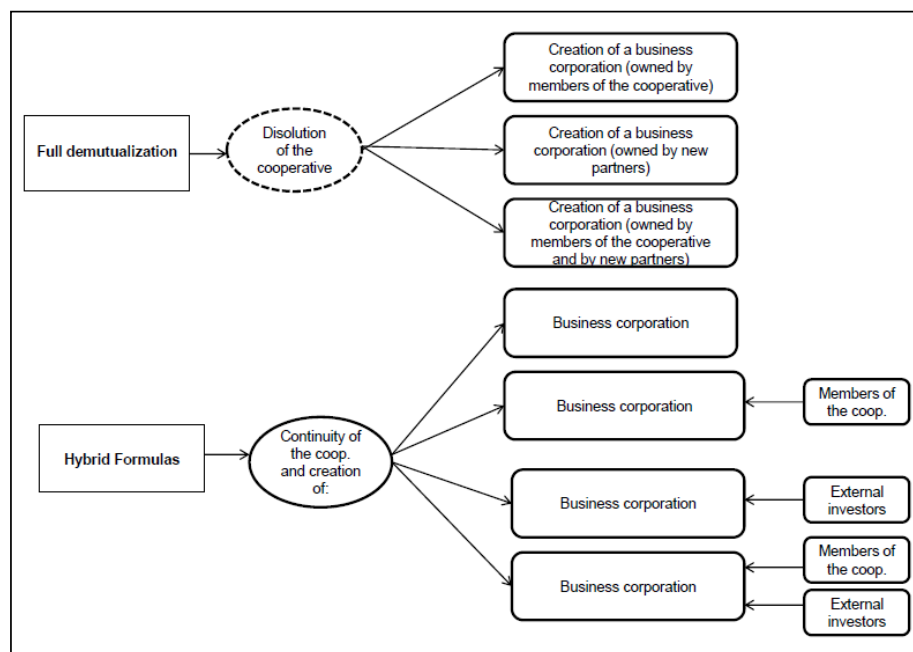
- In NGCs, a high percentage of the cash patronage is returned to members each year. However, in TCs, cash patronage rate is relatively low.
- The initial investment in TCs is usually very low.
- In NGCs, the market value for equity stock is reflected by the expected profitability of the NGC.
- According to business expansion, when a NGC spreads, it generally sells additional stock and creates more marketing rights. On the other side, in a TC expansion, usually no immediate investment from members takes place.

¹ PLC: *Public Limited Companies*

Barton (2004) made a comparison between the traditional forms of capitalization (open) used by American cooperatives and newly emerging forms (new generation, closed). Those cooperatives chose to add new capitalization elements (for example using publicly listed stock), or the conversion into different forms (such as LLC² or C corporation). The reasons that might motivate such changes could be access to capital, liquidity and revaluation of stock. He also outlined some of the challenges facing cooperatives in the future with reference to capitalization.

Based on the prior literature analyzed, there can be identified different organizational models among European agri-food cooperatives, responding to the need for business growth. These models can lead to a full demutualization (with the disappearance of the cooperative) or hybrid formulas, when the cooperative persists, incorporating different elements in order to raise capital. (Figure 1).

Figure 1. Organizational cooperative models in face of the business growth.



Source: own elaboration.

As it can be observed at Figure 1, full demutualization implies the total disappearance of the cooperative and the creation of a business corporation (whether owned by cooperative members, new shareholders or both).

On the contrary, in hybrid formulas, the cooperative continues, creating one or more business corporations, through which performs business activity; being the business corporation owned by the cooperative members themselves and / or by external investors. That is, hybrid formulas, which, as Beckum and Bijam (2006) pointed, they benefit from external capital sources, but maintain their cooperative identity; 'benefit' the best of both worlds. While smaller the share of the cooperative and its partners is, further away it is from the traditional model and closer to demutualization.

² LLC: Limited Liability Company

3.- Sample, data and methodology.

3.1. Sample selection and data.

For the selection of the sample, we used COGECA lists provided by one of its publications ("Agricultural Cooperatives in Europe. Main Issues and Trends", 2010), which showed the top ten European cooperative groups belonging to the dairy, meat, horticulture and supplies sectors. These lists were completed up to the top 20 by using the Amadeus database, according to the following criteria:

- Be a Cooperative belonging to the European Union.
- Belong to the dairy, meat, horticulture or supplies sector, following the classification of economic activities NACE Rev. 2.
- Be a cooperative group managed by a cooperative, and in case of business corporations it should be owned by a cooperative either 100% or with a share of over 50%, and thereby ensure that the cooperative has the control of the company.
- Turnover reached in 2009

Additionally, a list provided by the International Cooperative Alliance (ICA) showing the largest and most important 300 cooperatives at the European Union was consulted.

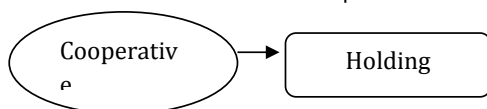
The final sample, with the 80 groups under study, is shown at Appendix 1 (alphabetically ordered).

3.2. Growth models at the major European agri-food cooperative groups.

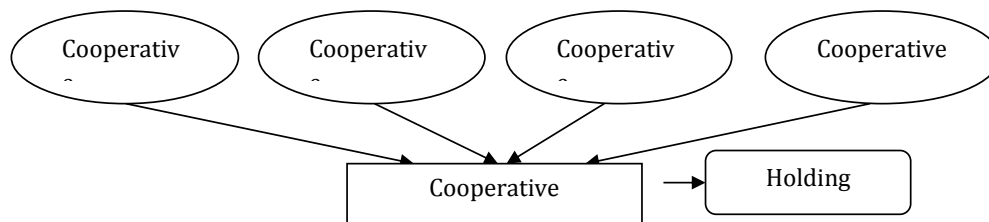
To establish the different organizational growth models developed, the corporate structure of the 80 groups was analyzed.

As a result, five categories have been established, corresponding to five different organizational forms, which are:

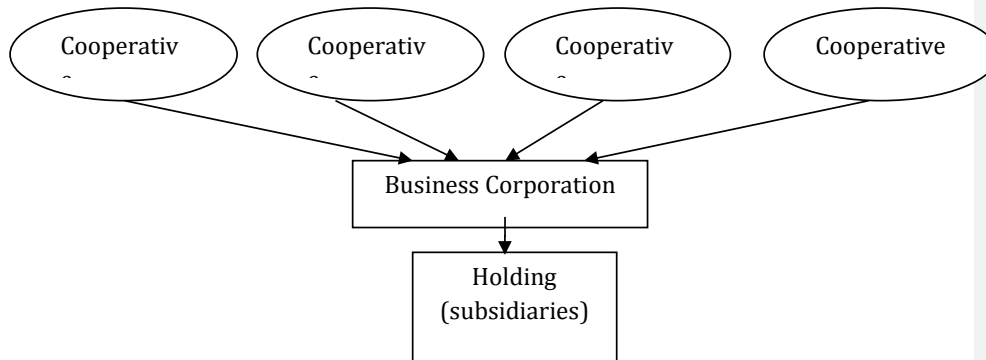
- **1. - Cooperatives which directly manage the group:** This group is made up of cooperatives which are the 'head' of the group and directly manage it, being the direct subsidiaries subordinated to the cooperative.



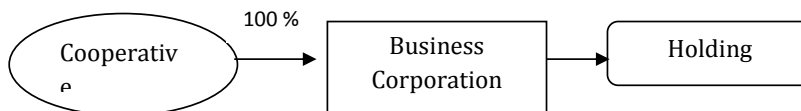
- **2. - Federated Cooperatives:** Cooperatives whose members are cooperatives. The second-level cooperative manages the holding.



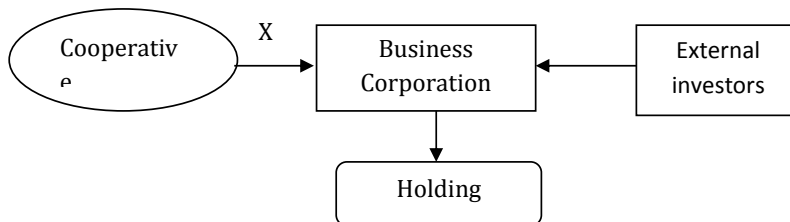
- **3. - Different cooperatives which create a business corporation as head of the group:** Different cooperatives (more than one) create a business corporation which manages the *holding*. It is similar to the federative model, but in this case the enterprise created by the cooperatives is a corporation instead of a cooperative.



- **4. - Cooperatives which have created a business corporation to perform the activity, from which they own the 100% of the capital:** This group includes those cooperatives that have created a business corporation to manage the holding or business group, being the cooperative the one who holds the 100% of the share capital of the subsidiaries. In this case the cooperative has total and direct control over the corporation and through it an indirect (total or partial) control over the subsidiaries.



- **5. - Cooperatives which have created a business corporation that manages the holding, admitting external investors:** In this case the cooperative has created a corporation, but it does not hold 100% of its capital. The cooperative or its members holds a percentage of it, belonging the rest to other investors. If the percentage of share capital held by external investors exceeds 50%, the group should not be considered a cooperative. In this case, in general the company goes public.



The five models presented above are ordered from 1 to 5, from highest to lowest proximity to the traditional cooperative model.

The 80 major agri-food cooperative groups of the sample have been classified in the five mentioned categories, in order to be analyzed. Classification is reflected in Table 1.

Table 1: Classification of cooperative groups of the sample.

CLASIFICACION OF THE DAIRY COOPERATIVE GROUPS	
1. Cooperatives which directly manage the group	ARLA FOODS TINE MILK LINK BAYERNLAND MILCOBEL MILCH-UNION HOCHFEL BERGALNDMILCH MLEKPOL
2. Federated Cooperatives	THE IRISH DAIRY BOARD (U.K.) LIMITED
3. Different cooperatives create a business corporation	VALIO OY LACTOGAL
4. Cooperatives which have created a business corporation to perform the activity, from which they own the 100% of the capital	CAMPINA NORDMILCH HOCHWALD SODIAL
5. Cooperatives that have created a business corporation that manages the holding, admitting external investors	KERRY GROUP HUMANA MILCHUNION GLANBIA EMMI GRANLATTE
CLASIFICACION OF THE MEAT COOPERATIVE GROUPS	
1. Cooperatives which directly manage the group	DANISH CROWN NORTURA SA WESTFLEISCH EG ARC ATLANTIQUE TICAN AMBA UNIPEG PRESTOR AVELTIS ITALCARNI PROSUS GESCO ERZEUGERGEMEINSCHAFT COÖPERATIE KONINKLIJKE CEBECO GROEP U.A.
2. Federated Cooperatives	COREN
3. Different cooperatives create a business corporation	MAINE VIANDE SOCOPA S.A COVALIS
4. Cooperatives which have created a business corporation to perform the activity, from which they own the 100% of the capital	VION N.V
5. Cooperatives that have created a business corporation that manages the holding, admitting external investors	HK SCAN AIM GROUP ATRIA OYJ
CLASIFICACION OF THE HORTICULTURE COOPERATIVE GROUPS	

1. Cooperatives which directly manage the group	FLORA HOLLAND LANDGARD FRUIT MASTERS SICA CONSORZIO CASOLANO CASI COOP. VEILING AGRINTESA (SOCIETA AGRICOLA COOPERATIVA O PIU BREVEVENTE AGRINTESA SOC) COSUN VEILING HOOGSTRATEN
2. Federated Cooperatives	CONSERVE ITALIA APO CONERPO ANECOOP CONSORZIO MELINDA VIP FRUTTAGEL
4. Cooperatives which have created a business corporation to perform the activity, from which they own the 100% of the capital	THE GREENERY B.V. FRESQ AGRICO CNB
CLASIFICACION OF THE SUPPLIES COOPERATIVE GROUPS	
1. Cooperatives which directly manage the group	AGRICOLA TRE VALLI-SOCIETA' COOPERATIVA VIVESCIA DLG SERVICE A/S FELLESKJØPET AGRI SA LANTMÄNNEN EK FÖR LUR BERRI NORIAP SCA NOURICIA SOCIETE COOPERATIVE AGRICOLE ARTERRIS SOCIETE COOPERATIVE AGRICOLE CAP SEINE SOCIETE COOPERATIVE AGRICOLE L E GOUSSANT STE COOPERATIVE AGRICOLE UNEAL
2. Federated Cooperatives	CAVAC (COOP AGRICOL VENDEE APPROV VENTE CEREALE) DLA AGRO A.M.B.A. EPIS CENTRE REG AGRARTECHNIK GMBH (RWZ RHEIN-MAIN) UNION INVIVO
5. Cooperatives that have created a business corporation that manages the holding, admitting external investors	AGRAVIS RAIFFEISEN AG BAYWA AKTIENGESELLSCHAFT RWA RAIFFEISEN WARE AUSTRIA AKTIENGESELLSCHAFT

Source: own elaboration.³

In the case of the horticulture sector, it is important to note that there are no cooperatives belonging to groups 3 and 5 between the top 20 European cooperative groups. Also, in the supplies sector there is no group belonging to groups 3 and 4.

3.3. Variables' description.

For the analysis, 15 indicators have been chosen. These indicators analyze five different areas of the enterprise: employment, size, solvency, profitability⁴ and cost efficiency (Table 2). All of them are referred to 2009.

³ See Remarks on Appendix 2.

⁴ Shermain and Vikas (2007)

Table 2: Classification of the variables.

Group	Variable	Explanation
Employment	Number of employees	
Size	Operating Revenue	
	Total assets	
	Shareholder funds	
Solvency	Solvency ratio	(Shareholder funds/total assets)*100
	Liquidity ratio	(Current assets-Stock)/Current liabilities
Profitability	ROE	(Profit and losses before taxes ⁵ /Shareholder funds)*100
	ROA	(Profit and losses before taxes/Total assets)*100
	Sales/Total assets	
	(PLBT+Materials ⁶)/Total assets	Profit and losses before taxes+ Materials/Total assets
	(PLBT+Materials)/Op.Revenue	Profit and losses before taxes+ Materials/Op. Revenue
Cost efficiency	Cost of employees/Op. Revenue	
	Depreciation/Op. Revenue	
	Materials/Op. Revenue	
	Financial Expenses/Current liabilities	

Source: own elaboration.

ROA and ROE limiting to measure cooperative profitability has lead us to use other profitability ratios in order to complement the analysis. In this sense, ROA and ROE reflect the capacity of the enterprise to return members through patronage refunds, but they do not take into account other benefits of the members, such as the cooperative capacity to pay high prices for their products. One approach to the analysis of both member returns is through the ratio PLBT+materials/assets or Op. revenue, which compares the benefit payable to members both through patronage refunds and materials to assets and operation revenue. So they can be interpreted as the capacity of the cooperative to benefit members both through patronage refunds and high prices paid for their products.

Although materials include not only the ones provided by members but the materials purchased from others, these ratios are a more accurate measure of the members return, as a high percentage of this item corresponds to members purchases. So, high differences between this ratio tendency and ROA and ROE, would indicate that a part of those poorer ROA or ROE is due to a better capacity to pay members production.

3.4. Methodology.

In order to know if there are significant differences between the identified groups, Kruskal-Wallis test has been used. This non-parametric test is analogous to one-way Anova test, and it has been chosen because there was no normality in the measurement variables. A post-hoc test was performed with the aim of testing exactly the groups where the differences were presented, so Mann-Whitney test has been applied for each pair of groups (post-hoc test required to determine where differences lie between the groups).

To test objective H2, two sets of entities have been analyzed (differentially): entities that created business corporations (with varying degrees of cooperative participation), and those who kept traditional cooperative structure. For that, the sample has been classified in two groups:

⁵ Profit and losses before taxes = PLBT

⁶ Materials refer to the raw materials and finished goods consumed in the year.

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- A (groups 1 and 2) → those with cooperative core.
- B (groups 3, 4 and 5) → those with business corporation identity.

To test differences between these two groups, Mann-Whitney test was used.

Secondly, logit function has been used to validate and complement the results obtained from the hypothesis' contrast. Specifically, we used logit (models of binary choice - cross section) to compare groups A and B at year 2009, because the dependent variable is dichotomous. Note that logit command estimates the discrete dependent variable model binomial using the maximum likelihood method, assuming that the error term is distributed as a logistic distribution (normal).

4. - Results of the empirical analysis.

4.1. - General Analysis.

After defining the variables and collected data in 2009 for all the groups and sectors we have obtained the following results (all of them shown at Appendix 3).

• Average size reached

Group 5 > Group 4 > Group 3 > Group 1 > Group 2

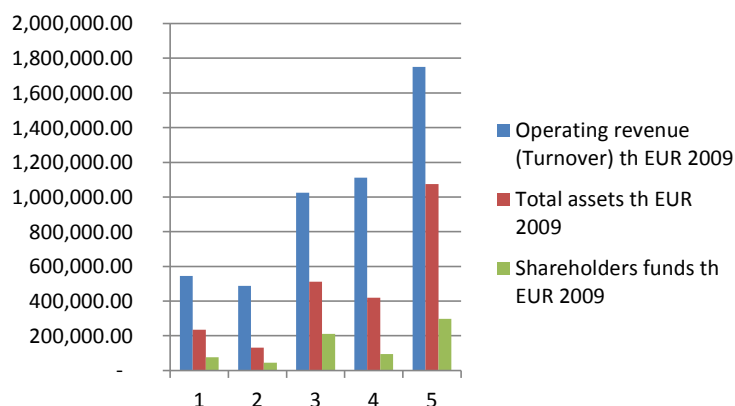
First of all, it can be observed that groups that have created a business corporation (with partial or total participation of the cooperative) have reached higher levels of operating revenue and size than groups that remained being purely cooperatives (being the biggest the ones belonging to the fifth group). This fact can also be observed with the number of employees, where groups 3, 4 and 5 have a higher number than group 1.

It can be pointed that group 4 cooperatives have a volume of shareholder funds similar to group 1, much lower than group 3 and 5 cooperatives. This is due to the absence of external capital investment, which slows down the expansion process. In group 3 this capital is provided by the cooperatives belonging to the holding.

In the dairy sector (See Appendix 3), cooperatives which have created a business corporation (from which they own the 100% of the capital), reach operating revenue levels which are three times higher than the ones registered by cooperatives of group 1.

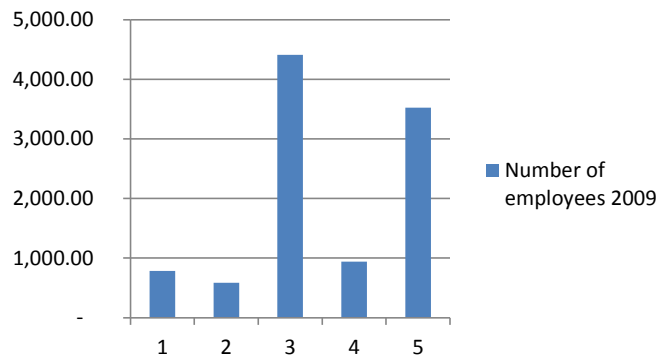
At the following Figures (2 and 3) it can be observed the summarize of those data.

Figure 2. Size indicators.



Source: own elaboration.

Figure 3. Number of employees



Source: own elaboration.

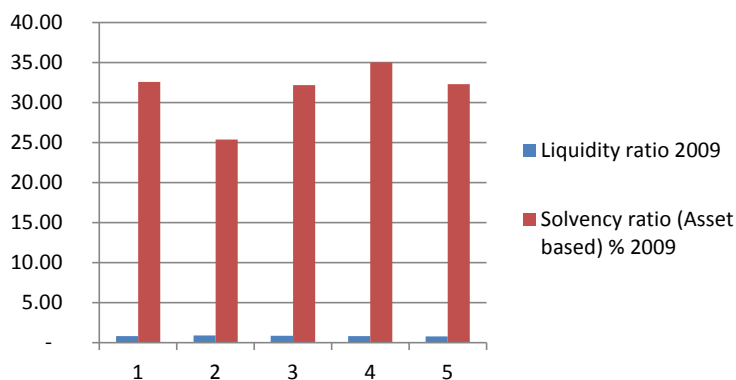
- **Solvency and liquidity**

In aspects as solvency, defined as the weight of shareholder funds within the total assets of the company, note that the group 2 show less solvency (being the group 2 which presents lower values), or in other words, have a higher borrowing, which makes sense, because they have created business corporations, but have not built new investors so the growth has been due partly to conditional entry debt capital. The other groups show similar solvency.

It must be pointed out that groups 1 (cooperative) and 5 (business_corporation with external partners), which are antagonistic in this work, have similar solvency ratios, when the main reason for the creation of limited liability companies and IPO (Initial Public Offering) is the inflow of capital from investors and therefore equity. This may be because the equity injection may be accompanied by an equally significant injection of external resources (borrowings).

In terms of liquidity, it is noted that there are no differences attributable to the structural model, showing all of them a similar ratio.

Figure 4. Solvency and liquidity ratios.



Source: own elaboration.

- **Profitability and cost efficiency**

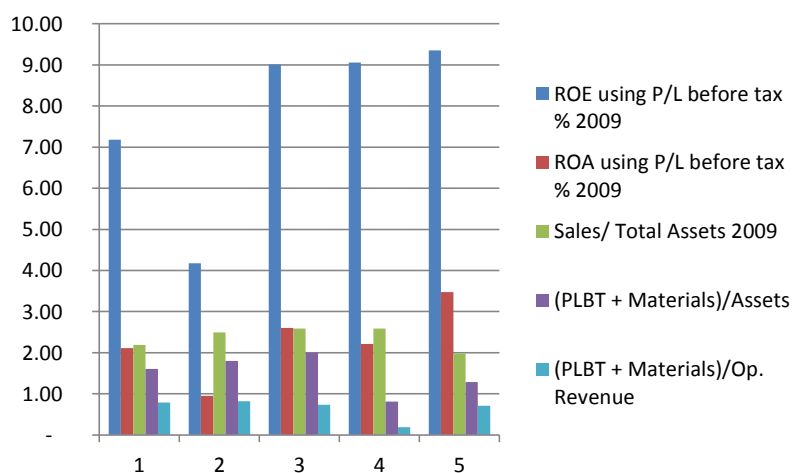
It is observed that group 5 is the one with the highest profitability. In general, groups that have created a business corporation are the ones with higher returns, both in ROA and ROE, compared to traditional cooperative which ranks 4 of 5 in both ratios.

These results support those obtained by Chaddad and Cook (2004), which concluded that the conversion of cooperatives into a business corporation and IPO, increases business efficiency and removes financial restrictions.

However, the ratios PLBT+materials/assets or Op. revenue, that reflect the capacity of the cooperative to benefit members both through patronage refunds and high prices paid for their products show different results.

As it is observed in figure 5, groups 1, 2 and 3 cooperatives have higher ratios than the ones included in group 4 and 5. This indicates that the first ones, the closer to the traditional model, have a higher capacity to return members (both through prices and patronage refunds), compared to assets investment and to revenue.

Figure 5. Profitability.

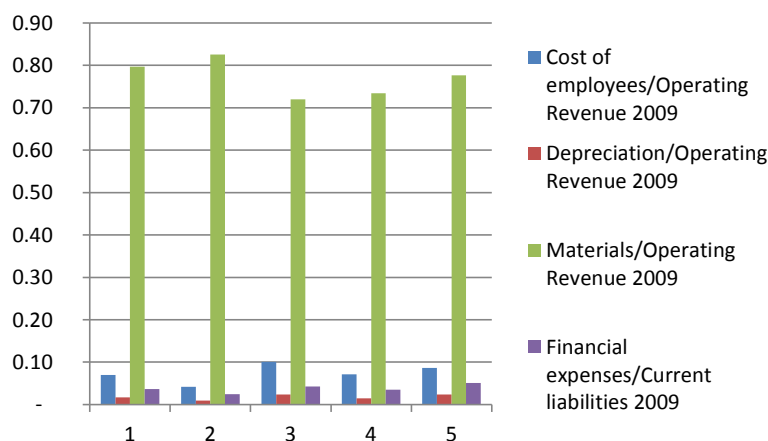


Source: own elaboration.

The percentage distribution of the major costs (materials, cost of employees and depreciation), indicates that group 3 (different cooperatives which create a business corporation as head of the group) spends a higher percentage of income to reward staff (10 %), compared to groups 1 and 2 (7 and 4 %). Besides, groups 1 and 2 are those which less labor costs. The percentage for depreciation is similar among the groups, with minor differences. And it is in the chapter of material costs, usually largely associated to members, as these are the main suppliers of the cooperative, where differences can be found. Not surprisingly, groups 1 and 2, closer to the traditional cooperative, are the biggest spenders on this concept (80 % of revenues), and group 3 is the one who spends less on this chapter (See Figure 6).

This may be because the provision by members is reduced in such entities, incorporating further purchases from third parties, or that the nature of the corporation marks less favorable criteria to the partner when assessing products, being that the reason why they have a superior ROA and ROE.

Figure 6. Cost efficiency.



Source: own elaboration.

4.2. - Comparative analysis between Traditional Cooperatives and Cooperatives which have created a business corporation.

From the sample of the 80 major agri-food cooperative groups and the analysis of their corporate information and financial statements, this paper also aims to check (using statistical tools) if there are significant differences between the cooperatives included in each identified growth model in areas such as business size, cost efficiency, and financial stability.

For that, a descriptive analysis has been performed to obtain the means and medians. Then Kruskal-Wallis test has been applied, because variables did not follow normality criteria (except the ratio PLBT+Materials/Op.Revenue).

Significant differences were observed at the following indicators: operating revenue, total assets, shareholder funds and number of employees. (See Table 3).

To identify the groups which showed statistically significant differences, Mann-Whitney test (post-hoc test required to determine where differences lie between our groups) has been used for each pair of groups. Significant differences have been found between group 1 and 5, and group 2 and 5 in size variables (Operating revenue, Total assets, employees and shareholder funds), as it can be observed on tables 3 and 4. Cooperatives of groups 1 and 2 have lower size than the ones of the group 5, being this difference statically significant.

No differences were identified in solvency, liquidity, profitability and efficiency ratios.

Table 3. Comparison of group 1 and 5.

VARIABLE (2009)	GROUP			
	1		5	
	Mean	Median	Mean	Median
Employment				
Number of employees	2.597,71	782,5 **	6.160,82	3.525 **
Size				
Operating revenue (Turnover) th EUR	1.058.069,83	545.610,13 **	2.521.603,13	1.750.427,25 **
Total assets th EUR	516.750,47	235.191 **	1.317.541,59	1.074.000 **
Shareholders funds th EUR	159.831,05	75.636,18 **	429.356,23	297.388 **
Solvency				
Liquidity ratio	1,57	0,82	0,86	0,80
Solvency ratio (Asset based) %	33,42	32,59	33,06	32,32
Profitability				
ROE using P/L before tax %	8,57	7,18	16,09	9,36
ROA using P/L before tax %	2,95	2,11	4,15	3,47
Sales/ Total Assets	2,93	2,19	2,66	1,98
(PLBT + Materials)/Assets	2,18	1,61	1,67	1,28
(PLBT + Materials)/Op. Revenue	0,69	0,79	0,57	0,71
Cost's efficiency				
Cost of employees/Operating Revenue	0,08	0,07	0,10	0,09
Depreciation/Operating Revenue	0,02	0,02	0,02	0,02
Materials/Operating Revenue	0,79	0,80	0,74	0,78
Financial expenses/Current liabilities	0,04	0,04	0,05	0,05
N	43		11	

NOTE: the difference in means/medians between both groups are significant at the .01 (***), .05 (**), .10 (*) level

Source: own elaboration.

Table 4. Comparison of group 2 and 5.

VARIABLE (2009)	GROUP			
	2		5	
	Mean	Median	Mean	Median
Employment				
Number of employees	967,67	586,5 **	6.160,82	3.525 **
Size				
Operating revenue (Turnover) th EUR	883.588,66	487.349,03 **	2.521.603,13	1.750.427,25 **
Total assets th EUR	321.605,48	131.049,44 **	1.317.541,59	1.074.000 **
Shareholders funds th EUR	90.028,31	44.064,72 **	429.356,23	297.388 **
Solvency				
Liquidity ratio	0,94	0,92	0,86	0,80
Solvency ratio (Asset based) %	27,31	25,38	33,06	32,32
Profitability				
ROE using P/L before tax %	10,25	4,18	16,09	9,36
ROA using P/L before tax %	4,44	0,95	4,15	3,47
Sales/ Total Assets	2,60	2,49	2,66	1,98
(PLBT + Materials)/Assets	1,84	1,80	1,67	1,28
(PLBT + Materials)/Op. Revenue	0,72	0,82	0,57	0,71
Cost's efficiency				
Cost of employees/Operating Revenue	0,06	0,04	0,10	0,09
Depreciation/Operating Revenue	0,01	0,01	0,02	0,02
Materials/Operating Revenue	0,78	0,83	0,74	0,78
Financial expenses/Current liabilities	0,03	0,02	0,05	0,05
N	13		11	

NOTE: the difference in means/medians between both groups are significant at the .01 (***), .05 (**), .10 (*) level

Source: own elaboration.

In a second analysis, two sets of entities have been compared: entities who have kept traditional cooperative structure, which correspond to groups 1 and 2; and those that have chosen in their development to create business corporations (with more or less cooperative participation), corresponding to groups 3 to 5. The following hypotheses were tested:

H1. Cooperatives which have opted for the creation of a business corporation, have achieved a larger dimension.

H2. Cooperatives which have maintained their traditional cooperative structure, have achieved greater financial stability compared to those which have opted for the creation of business corporations.

H3. Cooperatives which have opted in their development for the creation of a capital society have achieved higher levels of cost efficiency and profitability.

Mann Whitney test has been used for the hypothesis' contrast. As shown on Table 5, there are significant differences between group A (1+ 2) and B (3+4+5), specially in those variables concerning size, so we can accept the first hypothesis.

On the other hand, H2 hypothesis cannot be accepted, because no statistically significant differences could be tested in financial stability, measured through solvency and liquidity ratios, between group A and B.

Finally, we cannot accept that cooperatives which have opted in their development for the creation of a capital society (for the purpose of managing the group) have achieved higher levels of cost efficiency and profitability, as it can be observed on Table 5.

The expenses the cooperatives incurred in pay staff or depreciation as a percentage of sales, and financial expenses/current liabilities are lower in group A than in B, although they are not statistically significant. On the contrary materials cost/Op. revenue, is higher in group A than in B, although it does not imply a loss of efficiency of A group, as the member is the receptor of that expense.

Regarding to profitability ratios, while ROA and ROE (indicators of the patronage refund capacity) are higher in B group than in A, although not statistically significant; PLBT+ materials/operating revenue (indicator of both patronage refund capacity and paying members ability for their production) is higher in A group than in B, and in this case the difference is statistically significant.

Table 5. Group A vs. B.

VARIABLE (2009)	GROUP			
	A (1+2)		B (3+4+5)	
	Mean	Median	Mean	Median
Employment				
Number of employees	2.310,060	782,5 **	7.047,330	3471,5 **
Size				
Operating revenue (Turnover) th EUR	1.020.436,640	529.883,77 **	2.512.625,190	1.716.993,44 **
Shareholders funds th EUR	143.406,87 **	70.326,440	394.951,78 **	252.677,800
Total assets th EUR	470.834,000	215.820,26 **	1.212.820,070	949.421 **
Solvency				
Liquidity ratio	1,420	0,830	0,900	0,810
Solvency ratio (Asset based) %	31,985	30,460	32,450	32,576
Profitability				
ROE using P/L before tax %	8,963	6,342	12,547	9,208
ROA using P/L before tax %	3,298	1,827	3,458	2,563
Sales/ Total Assets	2,853	2,269	2,695	2,288
(PLBT + Materials)/Assets	2,102	1,653	1,462	1,241
(PLBT + Materials)/Op. Revenue	0,694 *	0,793	0,515 *	0,677
Cost's efficiency				
Cost of employees/Operating Revenue	0,073	0,063	0,091	0,082
Depreciation/Operating Revenue	0,019	0,016	0,020	0,020
Materials/Operating Revenue	0,789	0,802	0,702	0,754
Financial expenses/Current liabilities	0,039	0,030	1,065	0,042
N	56		24	

NOTE: the difference in means/medians between both groups are significant at the .01 (***), .05 (**), .10 (*) level

Source: own elaboration.

In a third approach, logistic regression analysis has been applied to compare and analyze both groups: A and B. For that, there have been selected different variables included in the 5 areas of study: employment, size, solvency, profitability and cost efficiency.

So, logistic regression has been applied with non-cooperative/cooperative as the dependent variable, being the variables selected as independent: operating revenue, PLBT+materials/Total assets, depreciation/Op.revenue, materials/Op.revenue, number of employees, and solvency ratio.

The results of the estimation are shown in Table 6, where it can be seen that two of the six independent variables were significant: Operating revenue and materials/op.revenue.

This analysis confirms that size (operating revenue), is a significant variable being the cooperatives that have created corporations significant bigger than traditional ones. Also, it is reflected that the ratio Materials/Op. Revenue is a significant variable, having the traditional cooperatives a higher ratio than corporations.

Table 6. Logit results

	P> z 	Marginal Effects
OpRevenue*	0.059*	2.35e-07
(PLBT+Materials)/Total assets	0.991	-.0008137
Depreciation/Op.Revenue	0.906	.760981
Materials/Op. Revenue*	0.088*	-.8966562
Number of employees	0.429	.0002104
Solvency ratio	0.347	.0040312

(Note: with Probit we obtained similar results)

Source: own elaboration.

As it is showed in Table 6, the Operating Revenue has a positive and significant effect on the probability of demutualize or create structures that deviate from the cooperative principles. On the contrary, the ratio Materials/Op. Revenue, has a negative and significant effect on the probability of demutualize. Marginal effects analysis indicate that every point that increases the ratio Materials/Op. Revenue (and increases the amount received by members for their production), the probability of creating a corporation decreases an 8%.

According to the goodness of fit in our model, our model predicts properly the 53,75 %.

5.- Conclusions.

Aspects as globalization and deregulation are changing the rules and business models around the world, increasing competition. These facts have a great impact on agri-food cooperatives, for several reasons.

Many cooperatives have embarked on a path marked by the implementation of changes in their organizational models, which take them away, to a greater or lesser extent, from traditional cooperative principles.

The analysis of 80 European agri-food cooperative groups, concludes that cooperatives that have opted for models based on the creation of a business corporation (either with full or partial participation of the cooperative), have achieved levels of turnover and size higher than groups which remained purely cooperative (federated or not).

In aspects as solvency, federated cooperatives present lower values than the rest of classified groups (at section 3), while the other groups show similar solvency. In terms of liquidity, it is noted that there are no differences attributable to the structural model, showing all of them a similar ratio.

In general, groups that have created a business corporation are the ones with higher returns, both in ROA and ROE, in comparison with the traditional cooperative. But on the contrary, the traditional cooperatives (federated or not) have higher PLBT+materials/assets and PLBT+materials/Op. revenue than the cooperatives that created business corporations, what can be interpreted as a higher capacity to return members (both through prices and patronage refunds).

As for the percentage distribution of the major costs (materials, cost of employees and depreciation), the results indicate that group 3 (different cooperatives which create a business corporation as head of the group) and 5 (cooperatives than created a corporation to manage the holding admitting external investors) spend a higher percentage of income to reward staff compared with traditional cooperatives and federative cooperatives, which confirms O'Connor and Thompson (2001) and other scholars, when they state that cooperatives pay lower salaries for senior managers compared to corporations. The percentage of depreciation is similar, with minor differences. And it is in the chapter of material costs, normally associated with partners, as they are the main suppliers of the cooperative, where we again find differences. Not surprisingly, groups 1 and 2, closer to the traditional cooperative, are the biggest spenders on this concept.

This may be due to smaller provision by members in such entities, incorporating further purchases from third parties, or because the nature of the created corporation sets less favorable standards to the partner when assessing products, being that the reason why they have a superior ROA and ROE.

Kruskal-Wallis test shows that there are statistical differences between the five groups identified, at the following indicators: operating revenue, total assets, shareholder funds and number of employees. Specifically, Mann-Whitney test showed that the differences were presented between groups 1 and 5, and 2 and 5 – traditional cooperatives vs. business corporations.

There were observed statistically significant differences between group A (entities who have kept traditional cooperative structure) and B (those that have chosen in their development to create business corporations, with more or less cooperative participation), specially in those variables concerning dimension (Operating revenue, total assets and number of employees), so we can accept the first hypotheses: Cooperatives which have opted for the creation of a business corporation, have achieved a larger dimension.

However, no statistical significant differences could be tested in financial stability, measured through solvency and liquidity ratios. Also, we cannot accept the second hypotheses,

that cooperatives which have opted in their development for the creation of a capital society (for the purpose of managing the group) have achieved greater financial stability.

Also there are not statistically significant differences in cost efficiency and profitability ratios (ROA and ROE), so we cannot accept that cooperatives which have opted in their development for the creation of a capital society (for the purpose of managing the group) have achieved higher levels of cost efficiency and profitability. On the contrary, traditional cooperatives (federated or not) have a statistically higher PLBT+materials/Op revenue than cooperatives that created a business corporation, showing a higher capacity to return members (both through prices and patronage refunds).

Finally, in a third approach, logistic regression analysis has been applied to compare and analyze both groups: A and B. This analysis confirms that size (operating revenue) and Materials/Op revenue are significant variables. Corporation model is confirmed as an efficient strategy to expand the company. Also, the ratio Materials/Op. Revenue appears as a significant variable, being the traditional cooperatives (federated or not) the ones that destine the largest volume of resources to pay for the materials, that in cooperatives are provided in a high percentage by members.

So, taking into account that depreciation costs/revenue are similar, that labor costs/operating revenue and financial expenses/current liabilities are lower in traditional cooperatives compared with the ones that created corporations, these higher prices paid for the materials acquired by traditional cooperatives (federated or not) seem to be the cause of their lower ROA and ROE.

We should note that this sample is not representative of the population, being based only on 80 groups (the first 20 groups in the dairy, meat, horticulture and suppliers sectors), and in some sectors and clusters models were built by two or three companies, because some of the tested models have still relatively low implementation. The results therefore represent a first approximation to the reality of these models and should be confirmed with a larger study, but undoubtedly mark a trend which is nothing remarkable.

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Código de campo cambiado

APPENDIX 1. FINAL SAMPLE (ALPHABETICALLY ORDERED).

AGRAVIS RAIFFEISEN AG	HK SCAN
AGRICO	HOCHWALD
AGRICOLA TRE VALLI-SOCIETA' COOPERATIVA	HUMANA MILCHUNION
AGRINTESA SOCIETA AGRICOLA COOPERATIVA O PIU BREVEMENTE AGRINTESA SOC	ITALCARNI
AIM GROUP	KERRY GROUP
ANECOOP	LACTOGAL
APO CONERPO	LANDGARD
ARC ATLANTIQUE	LANTMÄNNEN EK FÖR
ARLA FOODS	LUR BERRI
ATRIA OYJ	MAINE VIANDE SOCOPA S.A
AVELTIS	MILCH-UNION HOCHEIFEL
BAYERNLAND	MILCOBEL
BAYWA AKTIENGESELLSCHAFT	MILK LINK
BERGALNDMILCH	MLEKPOL
CAMPINA	NORDMILCH
CASI	NORIAP
CAVAC (COOP AGRICOL VENDEE APPROV VENTE CEREALE)	NORTURA SA
CNB	PRESTOR
CONSERVE ITALIA	PROSUS
CONSORZIO CASOLANO	REG AGRARTECHNIK GMBH (RWZ RHEIN-MAIN)
CONSORZIO MELINDA	RWA RAIFFEISEN WARE AUSTRIA AKTIENGESELLSCHAFT
COOP. VEILING	SCA NOURICIA:
COÖPERATIE KONINKLIJKE CEBECO GROEP U.A.	SICA
COREN	SOCIETE COOPERATIVE AGRICOLE ARTERRIS
COSUN	SOCIETE COOPERATIVE AGRICOLE CAP SEINE
COVALIS	SOCIETE COOPERATIVE AGRICOLE L E GOUSSANT
DANISH CROWN	SODIAAL
DLA AGRO A.M.B.A.	STE COOPERATIVE AGRICOLE UNEAL
DLG SERVICE A/S	THE GREENERY B.V.
EMMI	THE IRISH DAIRY BOARD (U.K.) LIMITED
EPIS CENTRE	TICAN AMBA
ERZEUGERGEMEINSCHAFT	TINE
FELLESKJØPET AGRI SA	UNION INVIVO
FLORA HOLLAND	UNIPEG
FRESQ	VALIO OY
FRUIT MASTERS	VEILING HOOGSTRATEN
FRUTTAGEL	VION N.V
GESCO	VIP
GLANBIA	VIVESCIA
GRANLATTE	WESTFLEISCH EG

APPENDIX 2. REMARKS OF THE SAMPLE.

DAIRY

- KERRY GROUP → was included on the list because it is a very important example, despite having the cooperative less than 50 % of weight.
- In 2011, HUMANA MILCHUNION EG and NORDMILCH EG agreed the merger of their subsidiaries HUMANA MILCHINDUSTRIE GMBH and NORDMILCH AG to create the new corporation DMK DEUTSCHES MILCHKONTOR GMBH.
For that, NORDMILCH AG had to change its legal form and become a GmbH. In that merge, the participation at DMK of both societies is equitative and does not affect to both matrix cooperatives (Humana MILCHUNION EG Y NORDMILCH EG).

MEAT

- Cooperatives excluded for not having enough information, or for being multi-function, despite having a huge operating revenue:
MICARNA SA, KERMENE, RASTING, DELPEYRAT, LUR BERRI (LA HEMOS METIDO EN SUMINISTROS), CARNJ SOCIETA COOPER, SICAREV, SICAVYL.

HORTICULTURE

- Cooperatives excluded for not having enough information, or for being multi- function, despite having a huge operating revenue:
ACOREX S.C.L., AN S.COOP, ASSOCIATION REGIONALE, UNION COOPERATIVE AGRICOLE FRANCE PRUNE, FRANCE CHAMPIGNON.

SUPPLIES

- Remarks on COGECA list → There it appears CHAMPAGNE CEREALES (whose actual name is VIVESCIA) and we have included it on the list, despite being participated by UNION IN VIVIO (4%)
- EPIS CENTRE merged and nowadays is AXEREAL, but we considerate it because we used data from 2009.
- SCA NOURICIA → at Amadeus Database it appears in dissolution, but we used it at our study because we had data from the year 2009.
- BAYWA AG → its operating revenue at Amadeus (4.428.726.000 €) is not the same as its annual accounts. For the classifications we took the amount oat its annual accounts (on 2009).
- Cooperatives excluded for not having enough information, or for being multi-function, despite having a huge operating revenue:
SUCRERIES-DISTILLERIES DE L' AISNE (SDA), TERRENA, TRISKALIA, M.R.B.B. OF MAATSCHAPPIJ VOOR ROEREND BEZIT VAN DE BOERENBOND (AVEVE), SUOMEN OSUUSKAUPPOJEN KESKUSKUNTA (SOK corporation).

APPENDIX 3.

Means and medians of the five groups identified.

VARIABLE (2009)	GROUP									
	1		2		3		4		5	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median	Mean	Median
Employment										
Number of employees	2.597,71	782,5	967,67	586,5	4.410,00	4.410,00	9.112,17	942,00	6.160,82	3.525
Size										
Operating revenue (Turnover) th EUR	1.058.069,83	545.610,13	883.588,66	487.349,03	1.025.081,45	1.025.081,45	2.872.166,46	1.111.905,00	2.521.603,13	1.750.427,25
Total assets th EUR	516.750,47	235.191,00	321.605,48	131.049,44	511.355,78	511.355,78	1.244.194,06	420.397,75	1.317.541,59	1.074.000
Shareholders funds th EUR	159.831,05	75.636,18	90.028,31	44.064,72	210.613,74	210.613,74	393.730,16	94.762,15	429.356,23	297.388
Solvency										
Liquidity ratio	1,57	0,82	0,94	0,92	0,86	0,86	0,97	0,82	0,86	0,80
Solvency ratio (Asset based) %	33,42	32,59	27,31	25,38	32,20	32,20	31,67	35,01	33,06	32,32
Profitability										
ROE using P/L before tax %	8,57	7,18	10,25	4,18	9,01	9,01	7,99	9,06	16,09	9,36
ROA using P/L before tax %	2,95	2,11	4,44	0,95	2,60	2,60	2,61	2,22	4,15	3,47
Sales/ Total Assets	2,93	2,19	2,60	2,49	2,59	2,59	2,78	2,59	2,66	1,98
(PLBT + Materials)/Assets	2,18	1,61	1,84	1,80	2,00	2,00	0,98	0,81	1,67	1,28
(PLBT + Materials)/Op. Revenue	0,69	0,79	0,72	0,82	0,73	0,73	0,37	0,19	0,57	0,71
Cost's efficiency										
Cost of employees/Operating Revenue	0,08	0,07	0,06	0,04	0,10	0,10	0,07	0,07	0,10	0,09
Depreciation/Operating Revenue	0,02	0,02	0,01	0,01	0,02	0,02	0,02	0,01	0,02	0,02
Materials/Operating Revenue	0,79	0,80	0,78	0,83	0,72	0,72	0,61	0,73	0,74	0,78
Financial expenses/Current liabilities	0,04	0,04	0,03	0,02	0,04	0,04	2,94	0,04	0,05	0,05
N	43		13		4		9		11	

Source: own elaboration.

Economic indicators of effectuated groups and sectors.

SECTOR	GROUP	N	VARIABLE														
			Operating revenue (Turnover) th EUR 2009	Total assets th EUR 2009	Shareholders funds th EUR 2009	ROE using P/L before tax % 2009	Solvency ratio (Asset based) % 2009	Number of employees 2009	ROA using P/L before tax % 2009	Liquidity ratio 2009	Sales/ Total Assets 2009	Cost of employees/ Operating Revenue 2009	Depreciation/ Operating Revenue 2009	Materials/ Operating Revenue 2009	(PLBT + Materials)/ Assets	(PLBT + Materials) /Op. Revenue	Financial expenses/ Current liabilities 2009
			Median	Median	Median	Median	Median	Median	Median	Median	Median	Median	Median	Median	Median	Median	Median
DAIRY	Group 1	8	619.462,64	264.843,50	121.397,42	7,56	34,74	1.382,00	2,59	0,96	2,31	0,09	0,03	0,77	1,55	0,72	0,03
	Group 2	1	73.216,93	13.056,26	-	21,18	17,83	-	3,78	1,24	-	-	-	-	0,04	-	0,10
	Group 3	2	1.802.635,00	949.421,00	405.313,00	6,18	42,69	4.410,00	2,64	1,22	1,88	0,12	0,03	0,62	1,20	0,63	0,06
	Group 4	4	1.792.020,00	1.086.703,00	361.949,00	6,65	36,72	10.019,00	2,22	0,65	2,29	0,07	0,01	0,73	1,73	0,73	0,04
	Group 5	5	1.750.427,25	1.114.615,60	297.388,00	19,61	30,95	3.418,00	6,14	0,84	1,55	0,09	0,03	0,67	0,79	0,53	0,06
	TOTAL	20															
	AVERAGE		1.491.136,22	697.760,01	239.820,74	3,77	32,59	4.807,25	1,96	0,98	2,01	0,09	0,03	0,70	1,05	0,65	0,06
MEAT	Group 1	13	460.283,10	202.942,31	63.860,12	8,01	31,39	520,00	1,68	0,92	2,37	0,05	0,01	0,85	1,77	0,84	0,03
	Group 2	1	691.529,26	293.167,19	93.341,40	3,56	31,84	1.492,00	1,13	0,83	2,34	0,06	0,03	0,82	1,94	0,82	0,03
	Group 3	2	247.527,90	73.290,55	15.914,48	11,84	21,71	-	2,57	0,50	3,30	0,08	0,01	0,82	2,80	0,83	0,02
	Group 4	1	9.039.991,00	3.118.193,00	795.443,00	9,70	25,51	32.734,00	2,47	0,85	2,88	-	-	-	0,02	0,01	0,10
	Group 5	3	1.320.644,00	1.074.000,00	398.700,00	3,79	37,12	6.214,00	1,50	0,92	1,98	0,12	0,02	0,70	1,28	0,64	0,08
	TOTAL	20															
	AVERAGE		2.351.995,05	952.318,61	273.451,80	7,38	29,52	10.240,00	1,87	0,80	2,58	0,08	0,02	0,80	1,57	0,63	0,05
HORTICULTURE	Group 1	10	220.506,92	154.490,32	36.650,31	2,79	28,70	350,00	0,75	0,78	2,10	0,07	0,02	0,79	1,91	0,77	0,03
	Group 2	6	202.179,47	104.560,56	31.111,74	2,92	23,42	867,00	0,49	1,05	2,13	0,06	0,01	0,75	1,79	0,76	0,02
	Group 3	0															
	Group 4	4	233.666,00	53.185,50	27.785,50	9,06	32,22	193,00	1,81	1,14	3,28	0,07	0,02	0,49	0,81	0,19	0,01
	Group 5	0															
	TOTAL	20															
	AVERAGE		218.784,13	104.078,79	31.849,18	4,92	28,11	470,00	1,02	0,99	2,50	0,07	0,01	0,68	1,50	0,57	0,02
SUPPLIES	Group 1	12	542.650,73	256.597,41	92.508,03	9,44	33,44	700,00	2,93	0,70	1,93	0,06	0,02	0,77	1,49	0,78	0,05
	Group 2	5	633.324,03	276.803,62	87.527,28	15,25	31,72	171,50	4,74	0,81	3,11	0,03	0,01	0,87	2,15	0,87	0,04
	Group 3	0															
	Group 4	0															
	Group 5	3	4.991.580,40	1.065.343,15	252.677,80	8,92	32,58	4.290,00	2,55	0,64	2,47	0,04	0,01	0,87	2,11	0,89	0,04
	TOTAL	20															
	AVERAGE		2.055.851,72	532.914,73	144.237,70	11,20	32,58	1.720,50	3,41	0,72	2,50	0,05	0,01	0,84	1,91	0,85	0,04
N		80															

Source: own elaboration.