Is the Ownership Structure Model a Decisive Determinant of Co-Operatives' Financial Success? A Financial Assessment

Nikos Kalogeras[1], Joost M.E. Pennings[1,2,3], Joost Kuikman[1], Michael Doumpos[4].

[1]Marketing-Finance Research Lab, School of Business & Economics, Maastricht University, the Netherlands (n.kalogeras@maastrichtuniversity.nl; jme.pennings@maastrichtuniversity.nl; j.kuikman@maastrichtuniversity.nl) .

[2] Marketing & Consumer Behavior Group, Wageningen University, the Netherlands.

[3] Office for Futures & Options Research (OFOR), University of Illinois at Urbana-Champaign, IL, US.

[4] Dept. of Production Engineering & Management, Technical University of Crete, Crete, Greece. (mdoumpos@dpem.tuc.gr).

Selected Paper prepared for presentation at the Agricultural & Applied Economics Association's 2011AAEA & NAREA Joint Annual Meeting, Pittsburgh, Pennsylvania, July 24-26, 2011

Is the Ownership Structure Model a Decisive Determinant of Co-Operatives' Financial Success? A Financial Assessment

Abstract. In this paper, the financial/ownership structures of agribusiness co-operatives (co-ops) are analyzed in order to examine whether new co-op models perform better than the more traditional ones. The assessment procedure introduces a new financial decision-aid approach, which is based on data-analysis techniques in combination with a Preference Ranking Organization Method of Enrichment Evaluations (PROMETHEE II). The application of this multi-criteria decision-aid approach allows the rank ordering of the co-ops on the basis of the most prominent financial ratios. The financial ratios were selected using principal component analysis. This analytical procedure reduces the dimensionality of large numbers of interrelated financial performance measures. We assess the financial success of selected EU agribusiness co-ops for the period 1999-2007. Results show that there is no clear-cut evidence that co-op models used to attract outside equity perform better than the more traditional models. This suggests that ownership structure of co-ops is not a decisive factor for their financial success.

Keywords: agribusiness cooperatives, financial success, multicriteria decision-aid analysis.

1. Introduction

Cooperatives (co-ops) have long been criticized for their inefficient decision-making process and their capital constraints (e.g., Cook, 1995; Karantinis and Nilsson, 2007). The latter occurs because agribusiness co-ops have traditionally adhered to exclusive members' ownership in the form of direct investments or retained patronage refunds (Knoeber & Baumer, 1989, Barton, 1989). However, many co-ops, in order to successfully adapt to the industrialization of agricultural and food markets, have relaxed their traditional finance principle (Cook and Chaddad, 2004). The extent to which co-ops relax this definitional principle influences their financial structure, ranging from a traditional (collective) to a more individualized, IOF-like (investor-owned firm) structure (Kalogeras, *et al.* 2007; Benos *et al.*, 2009). That is, numerous co-ops in the US and EU allow for individualized equity shares, invite non-member parties to partially finance their operations, and publicly list parts of their equity stock (Kalogeras, *et al.* 2009; Bijman and van Bekkum, 2005). A question that arises is whether the individualization of the ownership structure is driving the financial performance, that is, whether the co-op's ownership structure is a decisive determinant of success.

In the literature on the performance of co-ops and IOFs, two main approaches have been proposed. The first is the neoclassical approach, which deals with the efficiency of the two organizational forms and, consequently, the influence on their functioning in the marketplace (e.g., Fulton and Giannakas, 2001; Notta and Vlachvei, 2007). The second approach accounts for comparisons of the financial ratios of co-ops and IOFs (e.g., Gentzoglanis, 1997; Harris and Fulton, 1996). The identification of differences in ratios allows for a comparison of the financial performance of both organizational forms. These studies often emphasize the superiority, in terms of financial performance, of the IOF-like models. However, agribusiness co-ops have experienced an inherently dynamic restructuring process (Kalogeras, *et al.* 2009), and in order to adapt to agricultural industrialization (Chaddad and Cook, 2004) have increasingly been involved in value-adding processing, branding and market-oriented activities and strategies (Benos, *et al.* 2009). Hence, new co-op models have emerged that relaxed their financial equity constraints by attracting outside equity (Chaddad and Cook, 2004; van Bekkum and Bijman, 2006). As a consequence, property rights, ownership rights and residual claim rights, are redistributed in the intra-organizational co-op environment

(Iliopoulos, 1998). The new models vary between the polar forms of the traditional co-op model and the IOF-like model.

The objective of this paper is to assess the financial performance of agribusiness co-op models with different ownership characteristics, i.e., traditionally organized co-ops, member-investor co-ops, and public listed co-ops. To the best of our knowledge, this is the first empirical study that compares the financial performance of agribusiness co-op models with different equity structures. Further, this study expands the current literature on country-specific co-op performance. We evaluate the performance of selected agribusiness co-op models established and operating in the European Union. More specifically, we investigate which specific models perform better than others. This allows insights into how the organizational reform of co-ops is linked to their financial viability. Nilsson and Gunnarsson (2000) argued that the turnover of Swedish co-ops that converted into a new generation co-op model (NGCs) increased significantly. In addition, Bijman and van Bekkum (2005) provide similar insights for the Dutch agribusiness co-ops based on descriptive case-study results .

To address our objective, we apply a newly developed multi-criteria decision-aid methodological framework. This framework provides clear results: the selected co-op models are ranked based on their financial viability. Particularly, it provides insights on how co-ops outrank their peers, and, hence, whether newly emerged co-op models have contributed to this. These results show that there is no clear-cut evidence supporting the premise that the more IOF-like co-op models perform better than the more traditional ones.

The remainder of this paper is structured as follows. In section 2, we briefly discuss relevant theoretical foundations. The decision context is presented in section 3, and section 4 describes the specifications of our modeling framework. Section 5 presents the results while in chapter 6 conclusions are drawn and research challenges are mentioned.

2. Theoretical Background

The economic and institutional environment of agribusiness co-ops has changed dramatically (Cook, 1995): the markets have been liberalized, consumer demands have become more stringent, legislation on food quality and safety has been tightened, technological development is not standing still, and global agricultural food grades and standards are being introduced (Meulenberg, 2000). As a result, co-ops have become more market oriented, instead of producer driven, in order to adapt to the industrialization, meet the new standards within the food supply chain, and compete in globalized liberal markets (Kyriakopolos, 2000). According to Cook (1997), the success of user-oriented agricultural firms (i.e., co-ops) depends on their ability to: (a) understand the property-rights constraints faced in attempting internationalization, (b) upgrade their sustainable competitive advantages, (c) develop globalization or multi-domestic strategies, and (d) create new institutions that simultaneously facilitate the enhancement of member-investor needs. Therefore, competitive strategies are launched, such as value-added processing, global expansion, and brand-name development (Bijman and Ruben, 2005). Yet, the adaptation of these new strategies requires restructuring of the co-ops' financial structure and substantial capital investments (Baourakis, *et al.* 2002)

The emergence of new co-op structures has been addressed by several co-op scholars over the last 20 years (Harte, 1997; van Dijk, 1997; Nilsson and Gunnarson, 2000; Chaddad and Cook, 2004; Cook and Chaddad, 2004; Bijman and van Bekkum, 2005; van Bekkum and Bijman, 2006, Kalogeras, *et al.*, 2007; Benos, *et al.* 2009). Most of these studies examine the re-engineering of co-op organizational forms from various theoretical angles: transaction-cost economics (e.g., Hendrikse and Veerman, 2001a) agency economics (Vitaliano, 1983), incomplete contracting theory (e.g., Hendrikse and Veerman, 2001b), industrial organizational economics (e.g., Bijman, 2002), and behavioural economics (e.g., Kalogeras, *et al.* 2007; 2009)

Chaddad and Cook (2004) discuss new co-op models based on residual control rights and residual claim rights typologies. Their work distinguishes 7 organizational models (see: Table 1). The first model is the traditional co-op, which is restricted to members only, where shares are redeemable, the benefits go to the patrons, and there are non-proportional member investments. The last model, conversion or demutualization, implies the overall change of the ownership structure to a corporate profit-oriented, proprietary organization. In this later model, the residual claim rights and control rights are reassigned among stakeholders.

The work of van Bekkum and Bijman (2006) discusses 50 cases of agribusiness co-ops that started experimenting with innovative capital and ownership structures over the past 20 years. The least innovative structural change was considered the possibility of appreciable and/or internally tradable shares. That is, members can capture part of the increasing co-ops' value over time. In addition, co-ops can issue externally tradable subordinate bonds. The advantage is that the bonds qualify as debt and no member control is lost. Furthermore, external investors can obtain a stake at subsidiary or group level. Then, there is the option of listing preferred stock. Finally, the co-ops can convert into farmer-owned limited-liability companies. All these structures have the benefit that control is maintained at the member level. Moreover, two general categories publicly listed co-ops were considered: (1) co-ops that convert to IOFs as part of their listing process, the so-called "Converted Listed Co-ops" and (2) co-ops that deliberately decided to retain as much of their collective structure as possible, thus creating hybrid ownership forms, which are known as "Hybrid Listed Co-ops".

At a more empirical level, studies dealing with the evaluation of the performance of co-ops versus IOFs have followed two main approaches: (a) studies based on the concept of economic efficiency and (b) studies analyzing financial ratios. Porter and Scully (1987) studied the efficiency of co-op firms by means of a production function and concluded that dairy co-ops were less efficient than dairy IOFs. Akridge and Hertel (1992) used a multiproduct variable cost function to compare the performance of farm supply co-ops and IOFs. Their results suggest that co-ops are not inefficient compared to their IOF-counterparties. Sergaki and Semos (2006) studied the parameters that determine the efficiency level of the agricultural co-op unions compared to IOFs in Greece. They provide evidence that the efficiency of co-ops is influenced differently than the efficiency of IOFs by factors such as economic size, leverage, business risk, and profitability.

Table 1: Structural Attributes of Cooperative Organizational Models.

Attributes	*Traditional Cooperative*	*Proportional Investment Cooperative*	*Member-Investor Cooperative*	*New Generation Cooperative*	*Cooperative with Capital Seeking Entities*	*Investor-Share Cooperatives*	*Investor-Oriented Firm*
Structural							
Control							
Voting Rule	1 Member 1 Vote	Proportional	Proportional	Proportional	Proportional	Proportional	Proportional
Management	Board of Directors (BoD)	BoD	BoD & Professionals	BoD & Professionals	BoD, Professionals & External Supervisory Body	BoD, Professionals & External Supervisory Body	BoD, Professionals & External Supervisory Body
Ownership							
Claim to ownership rights: preferred shares	Members only	Members only	Members only	Members only	Members only	Members and non-members	Members and non-members
Transferability of rights	No	No	No	Yes	Yes	Yes	Yes
Tradable rights	No	No	No	Yes	Yes	Yes	Yes
Redeemable rights	Yes	Yes	Yes	No	Yes	Yes	Yes
Appraisal of rights	No	No	Yes	Yes	Yes	Yes	Yes
Cost/Benefit							
Net Income	Through Price	Through Price in proportion to patronage	Through Prices in proportion to shareholdings and dividends	Through prices based on expected patronage and dividends	Through Price and Dividends	Through Price and Dividends	Through Price and Dividends

Source: Based on Cook and Chaddad 2004; expanded by Kuikman and Kalogeras (2009).

Other empirical studies focused simply on the comparison of the financial ratios between co-ops and IOFs. Lerman and Parliament (1990) compared performance in the American fruit and vegetables and dairy industry. They showed that co-ops in both industries were not inferior to comparable IOFs in terms of return on equity, debt to equity ratio, and ratio of earnings to interest. However, for the fruit sector, the managerial turnover ratios indicated a lower performance compared to IOFs. The dairy co-ops were found to perform better based on the results of those ratios. Harris and Fulton (1996) analyzed the financial performance of Canadian co-ops and IOFs and found that co-ops were at least as liquid as IOFs; the profitability of co-ops in the retail grocery and fish sector was found to be higher, and co-ops involved in the fruit and vegetables, feed, and grain handling sector performed better than IOFs selling and marketing similar products. This study also provided evidence that co-ops were at least as productive as IOFs, that the leverage within co-ops was sector specific, and that the growth rates between co-ops and IOFs were comparable. Further, Gentzoglanis (1997) compared the financial performance of dairy co-ops and IOFs in Canada. His results indicated that the economic and financial performance was comparable, and no major differences could be found in terms of profitability, productivity and the use of new technologies. However, significant differences in liquidity and working capital management were found. Hardesty and Salgia (2004) confirmed the results found by Lerman and Parliament (1990), indicating that there were no significant differences between the financial performance of co-ops and IOFs in the agribusiness sector in the US. The only significant difference found was that co-ops showed lower levels of leverage. A more advanced methodological and modeling framework using the financial ratios analysis as a starting point was introduced by Kalogeras, *et al.* (2005). The study applied a multi-criteria decision-aid system to rank-order the financial performance of Greek co-ops using several categories of financial ratios as a data pool. The same methodology was used by Zopounidis, *et al.* (2006) to analyze the performance of the agricultural unions in Crete. These studies focused on the evaluation and rankings of the financial performance of co-op firms, aiming at indentifying strengths and imperfections associated with the financial structure of co-ops.

Most studies so far focused on the strict difference in performance measures between co-ops and IOFs. This paper expands the literature by focusing on the performance of co-ops with differing financial/ownership attributes. We follow closely the methodological framework introduced by Kalogeras, *et al.* (2005), and we apply a multicriteria decision-aid approach. Although there are some arguments (e.g., Nilsson and Gunnarsson, 2000) that the transformation of a co-op firm into a publicly listed company increases turnover substantially, there is no clear-cut evidence on the performance of different co-op organizational models with different financial/ownership structures. This paper makes a first attempt to explore whether the financial success of co-op models with different equity structures is based on the type of ownership model/financial structure of a co-op. More specifically, this study empirically tests whether co-op models with IOF-like financial attributes perform better than co-ops with a more traditional organization structure.

3. Decision Context

The dataset consists of 14 agribusiness co-ops that started as a co-op or still maintain a (partial) co-op ownership structure at present. They were selected on the basis of having the largest turnovers in 2007 in the Netherlands (van Bekkum, 2007; Griffioen, 2007).[1] In addition, the selected co-ops also have a substantial market share in the European and global agribusiness industry. The financial structure of the selected co-ops ranges from traditional (i.e., collective) to IOF-like (e.g., co-ops with capital-seeking entities which attract outside equity capital). The annual reports and income statements were collected from the Annual Report Database (2009) and Amadeus Database for the period 1999-2007. Missing annual reports and/or income statements were collected directly from the co-ops. It should be mentioned that, for most co-ops, 31 December is the end of their book year. However, for two of the co-ops included in our sample, AVEBE and CNB, the book year ends on 31 July and 31 May, respectively.

Information about the organizational innovations of these co-op models was derived from the work of van Bekkum and Bijman (2004), which characterizes several co-ops by their innovative characteristics (cfr. Table 2). As most marketing co-ops have transformed into farmer-owned limited-liability companies, our sample consists only of those cases considered by van Bekkum and Bijman (2006).

Table 2: Innovative Characteristics of Dutch Co-ops in 2006.

Cooperative	*Organizational Innovations*
Agrifirm	n/a*
Avebe	Appreciable capital structure
Campina	Appreciable capital structure; subordinate bonds
Cebeco	External investors; bought listed companies
Cehave	n/a
CNB	n/a
DOC Kaas	n/a
Flora Holland	n/a
ForFarmers	Farmer-owned limited-liability company with the option of external investors
Friesland Foods	Appreciable capital structure; permanent bonds
Royal Cosun	n/a
The Greenery	n/a
Vion	Investor-owned firm
ZON	n/a

Source: Van Bekkum and Bijman (2006)

* not any organizational innovations were introduced during the examined period.

[1] The data collection and data analysis are both ongoing. We aim to assess the performance of the top 40 (in terms of annual turnovers) EU co-ops. Any new results will be presented throughout the conference presentation.

4. Modeling Framework

Following closely Kalogeras, *et al.* (2005), the first step in the assessment of the financial viability of co-ops was the financial ratio analysis. This put into perspective the balance sheet and income statement components of the different cooperatives. Next, a principle-components analysis (PCA) was applied to the financial ratios. This procedure revealed the most prominent financial ratios in the dataset. Finally, a multi-criteria decision-aid (MCDA) tool was utilized, namely the Preference Ranking Organization Method of Enrichment Evaluations (PROMETHEE II) that rank-ordered the co-op models with different financial structures on the basis of their financial ratios (Brans and Vincke, 1985). The stages of the modeling framework applied are displayed in Figure 1.

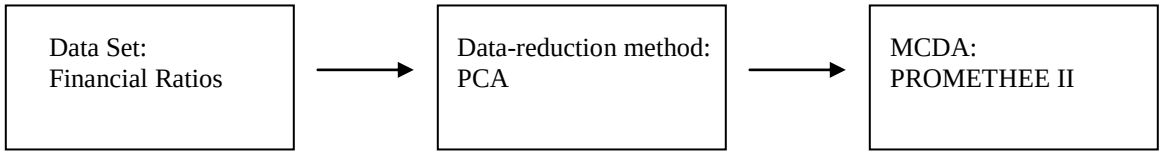


Figure 1: Modeling Framework

We selected a number of useful financial ratios to indicate the financial performance and risk-bearing ability of the selected agribusiness co-ops. We categorized them into three different groups: profitability, solvency, and managerial performance ratios. Table 3 depicts the financial ratios used in this study.

The next step was to identify the most prominent financial ratios out of the fifteen pre-selected ratios over a period of nine years. PCA identified the financial ratios that were most prominent. Specifically, PCA reduced the dimensionality of the dataset by extracting principal components that were uncorrelated and explained as much of the variation in the dataset (the first component explains most of the variation; the next explains most of the remaining variation, etc.). The process continued until there were as many components as variables used in the analysis. This procedure identifies which financial ratios explained most of the variation in the dataset over the examined period (1997-2007).

Finally, the PROMETHEE II was used to rank-order the co-ops on the basis of their financial ratios. This method is based on the outranking relation theory by Roy (1968), who defined the outranking relation as a binary relation *S* between alternatives *a* and *b* in a given set of alternatives A, such that *aSb* means that alternative *a* outranks alternative *b*. PROMETHEE II also accounted for the indifference between two alternatives. This implies that the choice between alternative *a* and *b* could cause indifference or preference for alternative *a* compared to *b*. The construction of the rank-ordering through the PROMETHEE II involved the evaluation of the alternatives (co-ops in a set of criteria – the financial ratios). Each financial ratio was given a decision weight depending on the importance of the financial ratio. Next, the preference for co-op A over co-op B was calculated for each financial ratio. Finally, the preference index was determined as:

$$\pi(a,b) = \frac{\sum_{i=1}^{n} p_i P_i(a,b)}{\sum_{i=1}^{n} p_i} \qquad (1)$$

where, p_i is the weight given to criterion *i,* P_i *(a,b)* is the preference intensity based on the chosen preference function, *n* is the number of evaluation criteria, and $\pi(a,b)$ is the preference index (which has a value between 0 and 1). The preference intensity is simply the preference of co-op A over co-op B (or vice versa) based on the difference between the values of criterion *i.* Brans and Vincke (1985) distinguish between six different preference functions (see: Figure 2). In this paper, the Gaussian preference function was used for all financial ratios. This is a smoothed generalization of the other five functions. This means that there were no discontinuities, which satisfied the properties of the other 5 functions, and hence led to more stable results. The only requirement is that a parameter σ is known. This is the distance between the origin and the inflexion point of the preference curve. The standard deviation of the criteria was used as an approximation for σ.

Table 3: Financial Ratios Used in Multi-criteria Analysis

Ratio group	*Codification*	*Financial ratio*
Profitability	GPM	Gross profit margin
	NPM	Net profit margin
	ROE	Return on equity
	ROA	Return on assets
	BEP	Basic earning power
Solvency	DR	Debt ratio
	QR	Quick ratio
	CR	Current ratio
	ICR	Interest coverage ratio
	LTLTC	Long-term liabilities to capital
Managerial performance	ITR	Inventory turnover
	ARTR	Accounts receivable turnover
	STLTR	Short-term liabilities turnover
	TATR	Total assets turnover
	FATR	Fixed assets turnover

The preference indices for all pairs of alternatives (*a,b*) explained the dominance of the alternatives for specific criteria. Graphically this could be represented in a value outranking graph. The nodes on the graph represent the alternatives, which are the co-ops in this case,

and the arc between the nodes represent the preference of alternative *a* over alternative *b*, when the direction of the arc goes from *a* to *b*, or vice versa. The flow of the arc represents the preference index $\pi(a,b)$. Next, a distinction is made between the sum of the flows that left a node and the sum of the flows that entered a node. The former is known as the positive flow $\varphi^{+}(a)$, and the latter is known as the negative flow $\varphi^{-}(a)$.

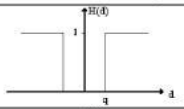
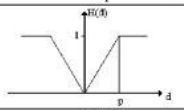
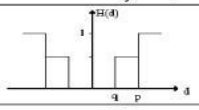
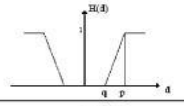
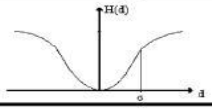
	Graphical form of generalized criteria	Parameters
I. Usual criterion		-
II. Quasi-criterion		q
III. Criterion with linear preference		p
IV. Level criterion		q, p
V. Criterion with linear preference & indifference area		q, p
VI. Gaussian criterion		σ

Figure 2: Forms of Preference Functions
Source: Brans and Vincke (1985).

The positive flow expresses how much one alternative dominates the other alternatives, and the negative flow how much it is dominated by the other alternatives. The difference between the positive and the negative flow, $\varphi(a) = \varphi^{+}(a) - \varphi^{-}(a)$, was the net flow for the node corresponding to alternative *a* (i.e., co-op A). It indicated the overall evaluation measure of the performance in node *a*. Finally, the alternatives are ranked based on their net flow. The node with the highest net flow is considered the best alternative, while the node with the lowest net flow is considered the worst alternative. Thus, co-ops with the highest net flow have the best financial viability.

5. Results

5.1 PCA results

Data reduction was achieved in 7 out of 9 years, with 3 to 5 extracted principal components. In addition, for most years there was a recurrence of groups of ratios in a component. As the correlations between several ratios were high, there was a high

probability that these ratios were grouped together in one component. The total variance explained across the years indicated how much the components explained the variance within the data set. Across the years, the total variance explained varies between 85.45% in 1999 to 92.91% in 2002. This result indicates that the components have a significant explanatory power. In addition, communalities were found larger than 0.6 and the eigenvalues for the components were larger than one. To select the most prominent ratios, the ratios with the highest loading were selected from the rotated component matrix over the years. If a component consisted of ratios that belonged to different groups of ratios (i.e., profitability, solvency, managerial performance), the highest ratio from each group was selected unless the difference in value was too high. If the correlation matrix indicated that the ratio with the highest loading was highly correlated with the other ratios in the same component, only the ratio with the highest loading was selected. This is shown in Table 4 for the examined period. The last column indicates the frequency of the most prominent ratio for each year. In the remainder of the analysis, the financial ratios with a frequency of four and higher were used to evaluate the financial viability of the co-op models with different financial/ownership structures.

Table 4: Frequency of Appearance of Financial Ratios in the Components

	1999	2000	2001	2002	2003	2004	2005	2006	2007	Frequency
Gross profit margin							■	■	■	**3**
Return on Assets					■	■	■	■	■	**5**
Return on Equity		■	■	■	■					**4**
Basic earning power	■	■	■	■	■	■				**5**
Net profit margin	■									**1**
Debt ratio									■	**1**
Current ratio	■		■	■	■	■	■	■		**7**
Quick ratio		■								**1**
Interest coverage	■	■	■	■	■	■	■	■	■	**9**
LT Liabilities to capital		■		■						**2**
Inventory turnover									■	**1**
Accounts Receivable turnover						■			■	**2**
ST Liabilities turnover	■			■	■		■			**4**
Total assets turnover		■	■			■	■	■	■	**6**
Fixed assets turnover				■	■					**2**

5.2 MCDA results

In order to rank-order the selected co-ops on the basis of their performance, a number of steps were taken. First of all, the preferences indices were calculated. To do so, the decision weights for the criteria had to be known as they are crucial in the preference function of PROMETHEE. We followed closely Kalogeras' *et al*. (2005) definition of the weights of the decision-criteria (i.e., method 1). In addition, a robustness check was conducted by creating 25 random scenarios and by calculating an average ranking of all scenarios (i.e., method 2). This check aimed at resolving the simplification of the decision weights adopted in the methodology.

The weights in method 1 are numbers that reflected the importance of each criterion. Different weights were used to examine how the ranking changed when different groups of ratios became more important. Table 5 shows the different scenarios used in this method. The last three columns show the weight of the group. For the first scenario, the weight for the profitability ratios (PR) was 1, which indicates that this ratio was considered the least important. The solvency ratios (SR) were assigned with a weight equal to 2, which implies that this group was more important. The weight for managerial performance ratios was assigned with a weight equal to 3, making this group of ratios the most important. Then the weight for the individual ratios was determined by dividing the weight by the number of ratios in the group. Thus, for the first scenario, there were 3 profitability ratios, and hence the weights for each individual profitability ratio were the weight of the group (1) divided by number of ratios (3). There were 2 solvency ratios, and hence the weights for the individual solvency ratios were the weight of the group (2) divided by the number of ratios (2). The same procedure was applied for the remaining scenarios.

Table 5: Weighting scenarios for the application of PROMETHEE II

	RoA	Bep	RoE	CR	IC	TATR	STLTR	Weight PR	Weight SR	Weight MPR
Scenario 1 (1,2,3)	0,33	0,33	0,33	1,00	1,00	1,50	1,50	1	2	3
Scenario 2 (1,3,2)	0,33	0,33	0,33	1,50	1,50	1,00	1,00	1	3	2
Scenario 3 (2,1,3)	0,67	0,67	0,67	0,50	0,50	1,50	1,50	2	1	3
Scenario 4 (2,3,1)	0,67	0,67	0,67	1,50	1,50	0,50	0,50	2	3	1
Scenario 5 (3,1,2)	1,00	1,00	1,00	0,50	0,50	1,00	1,00	3	1	2
Scenario 6 (3,2,1)	1,00	1,00	1,00	1,00	1,00	0,50	0,50	3	2	1
Scenario 7 (1,1,1)	0,33	0,33	0,33	0,50	0,50	0,50	0,50	1	1	1

Based on these scenarios, the average ranks over the years were calculated. For example, in 1999 there were seven scenarios, and the average rank in 1999 was the weighted average of these seven scenarios. The results of this application for the years 1999-2007 are displayed in Table 6.

To make sure that the ranking was consistent over the years, Kendall's coefficient of concordance (*Kendall's W*) was calculated. This indicated the agreement among the ratings during a year. *Kendall's W* ranges from 0 (no agreement) to 1 (complete agreement). As can be seen from Table 6, the coefficient was above 0.8 for every year. Thus, the ranking of the co-ops was consistent for the scenarios during individual years. In addition, the coefficient for the whole sample period was 0.779, indicating that the ranking was consistent for the whole period (1999-2007). The last column in Table 6 shows the average rank of the co-ops' performance all over the years.

Table 6: Method 1- Ranking of the Co-ops Performance for 1999-2007

	1999	2000	2001	2002	2003	2004	2005	2006	2007	Average
Agrifirm	8,857	8,857	9,714	11,714	11,714	11,857	11,571	11,571	12,143	12
Avebe	10,000	6,143	4,571	7,429	7,714	8,571	13,143	10,286	6,000	8
Campina	10,143	10,286	9,429	9,857	10,429	10,571	9,286	10,429	12,857	11
Cebeco	6,286	7,143	13,571	1,571	7,286	3,429	4,857	1,000	2,429	5
Cehave	12,857	11,429	7,571	13,286	6,714	6,714	6,000	6,571	6,714	9
CNB	1,000	2,000	2,286	4,143	3,143	6,143	5,429	5,429	3,429	3
DOC Kaas	2,000	1,000	1,000	1,429	2,571	3,429	1,571	2,000	1,000	1
Flora Holland	12,857	12,571	12,857	12,571	12,714	12,714	11,571	14,000	14,000	14
ForFarmers	3,571	3,571	3,286	4,000	1,143	2,000	1,714	4,429	4,143	2
Friesland Foods	7,714	4,571	6,286	8,429	9,000	7,143	6,571	7,571	8,714	6
Royal Cosun	4,429	4,000	4,000	5,143	4,714	1,286	4,857	3,286	9,714	4
The Greenery	8,429	13,714	9,714	7,429	6,429	9,286	4,857	7,429	10,714	10
Vion	4,143	7,857	7,571	5,714	7,429	8,143	9,000	9,143	8,000	7
ZON	12,714	11,857	12,286	12,286	14,000	13,857	13,143	11,857	5,143	13
Kendall's W	*0,926*	*0,964*	*0,951*	*0,926*	*0,841*	*0,896*	*0,861*	*0,887*	*0,939*	*0,779*

The robustness check (method 2) defined the decision weights by means of 25 random scenarios. Every scenario generated individual weights that varied between 0 and 1. In addition, the sum of the weights was supposed to be equal to 1. Thus, all criteria in total weighed 100 percent. This method was used to check whether the results of method 1 are robust.

Table 7: Method 2 - Ranking of the Co-ops' Performance for 1999-2007

	1999	2000	2001	2002	2003	2004	2005	2006	2007	Average
Agrifirm	8,880	7,840	9,680	11,840	11,360	11,440	11,280	11,400	11,720	12
Avebe	10,560	6,520	4,320	7,200	7,200	8,120	13,440	11,360	4,960	8
Campina	9,760	9,280	9,120	9,960	10,040	9,560	8,680	10,000	12,800	11
Cebeco	6,400	7,240	13,640	1,400	7,240	3,320	4,720	1,240	1,920	5
Cehave	13,000	11,920	7,720	13,520	6,360	6,320	7,280	6,280	7,240	10
CNB	1,400	2,840	3,200	5,880	5,520	8,600	7,640	7,120	4,720	4
DOC Kaas	2,520	1,000	1,280	1,920	4,440	6,000	2,440	2,880	1,720	1
Flora Holland	12,800	12,480	12,400	12,440	12,440	13,000	11,760	13,760	14,000	14
ForFarmers	3,040	3,320	3,400	4,560	1,800	1,880	1,360	4,320	3,560	2
Friesland Foods	7,440	4,600	6,200	7,920	8,600	6,160	5,920	6,720	7,360	6
Royal Cosun	4,240	3,840	3,800	4,480	3,600	1,520	4,720	3,200	8,840	3
The Greenery	7,840	13,440	9,240	6,920	5,960	8,520	4,640	6,720	10,440	9
Vion	4,520	8,840	8,320	5,080	6,560	7,760	8,560	8,920	8,440	7
ZON	12,640	11,840	12,680	11,840	13,880	12,800	12,560	11,080	7,280	13
Kendall's W	*0,897*	*0,913*	*0,875*	*0,878*	*0,674*	*0,752*	*0,815*	*0,802*	*0,852*	*0,664*

Based on the 25 scenarios, the average rank over the period 1999-2007 was calculated. Table 7 shows the results. The *Kendall's W* statistic indicates that there is sufficient

consistency among the ratings per year as all coefficients are above 0.65. In addition, *Kendall's W* for the whole period equals 0.664, and thus shows above average consistency among the ratings.

In addition, dividing the sample in 2 different groups generated the same results. The 2 groups were divided on the basis of the co-ops' innovative features as described in the research design (see: Table 2).

Table 8: Average ranking of Group 1

Co-op Name	*Rank-order*
Agrifirm	6
Cehave	4
CNB	2
DOC Kaas	1
Flora Holland	8
Royal Cosun	3
The Greenery	5
ZON	7

Table 9: Average ranking of Group 2

Co-op Name	*Rank-order*
Avebe	5
Campina	6
Cebeco	2
ForFarmers	1
Friesland Foods	3
Vion	4

By rank-ordering the performance of co-ops in these two groups, insights may be gained as to whether the overall ranking was consistent by examining fluctuations within the groups. The results are presented in the tables 8 and 9. It can be seen that the rank-order within the two different groups is exactly the same as the ranking of the co-ops in the whole sample. Therefore, the ranking itself was consistent over the years, both among co-ops with different organizational innovations (i.e., different financial structures than the traditional one) and within groups of co-ops with the same organizational innovations.

5.3 Summary of the Results & Discussion

The two methods used differ in the way they treat the weights of the criteria. However, comparing the results derived from both methods, the ranking does not differ substantially. From the results presented in table 10, it can be seen that only 4 companies exhibited different rankings. These deviations were pair-wise, meaning that the overall change in rank was only 1 place. Thus, it can be argued that the rankings were consistent in both methods. More importantly, these results confirm the application of method 1, which has been criticized for being simplified.

The empirical analysis attempted to explore whether the newly emerged ownership structures of co-ops perform better than the traditional ones. The results show that the top 4 performers are DOC Kaas, ForFarmers, CNB, and Royal Cosun, respectively. In addition, Agrifirm, ZON, and FloraHolland are the bottom 3 performers. Both the top and bottom performers have adopted mixed organizational innovations. Also, the results suggest that the viability of group 1 lacks behind group 2. In sum, there is no clear-cut evidence that the

co-ops with innovative financial structures perform better than the co-ops with more traditional financial/ownership structures.

Van Bekkum and Bijman (2006) showed that some new co-op models that have adopted financial innovations, exhibit IOF-like equity features in that co-ops issue subordinate or permanent bonds, outside investors are attracted at a subsidiary and/or group level, or the organizational form is transformed to a limited liability company with the retention of ownership or the full conversion to an IOF. In our sample, the co-ops Avebe, Campina, Cebeco, Friesland Food, ForFarmers, Royal Cosun, and Vion were expected to perform better, since additional equity provided them with new capital to finance growth opportunities, and start capital intense new projects. However, Vion (IOF) is ranked 7th, indicating an average performance of the company. Cebeco, ranked 5th, has external investors contributing to its equity structure and has adopted the most IOF-like structure. Although these two co-ops are in the top half of the rank-order, they do not significantly outperform the co-ops with more traditional financial structures.

Table 10: Average ranking of the Co-ops' Performance based on the Results of Both Methods

Co-op Name	*Method 1*	*Method 2*
Agrifirm	12	12
Avebe	8	8
Campina	11	11
Cebeco	5	5
Cehave	9	10
CNB	3	4
DOC Kaas	1	1
Flora Holland	14	14
ForFarmers	2	2
Friesland Foods	6	6
Royal Cosun	4	3
The Greenery	10	9
Vion	7	7
ZON	13	13

Another interesting observation concerns Campina, which ranked 11th. Campina has introduced multiple innovative structural features to attract new equity. It seems that, while Campina has indeed attracted substantial amounts of outside equity, this increasing equity has not contributed to the overall viability of the firm. Furthermore, Friesland Foods and Avebe also rank in the middle, holding the 6th and 8th position, respectively. ForFarmers, ranked 2nd, has been performing relatively well over the examined period but does not clearly outrank co-ops with a more traditionally organized financial structure. Interestingly, one of the eight more "traditionally" oriented co-ops, Doc Kaas, ranks 1st, while CNB ranks 3rd. These results indicate that even co-ops with a relatively smaller economic size and more traditional ownership structure can be financially viable in terms of profitability, solvency, and managerial turnovers. DOC Kaas surpasses the other co-ops mostly in terms of the interest coverage ratio and basic earning power, which resulted in a large overall net flow. At the bottom end of the table, ZON and FloraHolland confirmed the expectations of

being the relatively worst performers. Note that these results do not suggest a bad financial outlook for these co-ops. The other co-ops simply show a better performance over the examined time period.

Overall, these results confirm the general inferences in co-op economics that even co-ops with a traditional financial structure can perform at least as well as IOF-like models (e.g., Leerman and Parliament, 1990; Hardesty and Salgia, 2004). For the selected co-ops, the results highlight that attracting outside equity may help improve the financial position of the business but does not automatically imply a structurally better position in terms of viability. Outside equity provides the possibility to finance growth opportunities and/or improve the viability of the co-op firms. However, consistent with our results, the co-ops with the largest turnovers are not always the co-ops with the best financial position. Thus, the co-ops that adapted financial innovations may need to improve the overall viability in order to take full advantage of the outside equity.

6. Conclusive Remarks

In this paper, the financial performance of various co-ops models was studied by using a combination of multivariate data techniques and a modeling framework from financial engineering. The financial performance of selected agribusiness co-ops was examined. The ranking, which was based on the financial indicators of the selected co-ops over a period of 9 years, does not explain the economic outlook of the co-ops (e.g., financial distress). Rather, it is a comparative ranking among the agribusiness co-ops on the basis of selected financial ratios, which were used as criteria. The rank-order shows a mixed ranking of the co-ops (with or without innovative ownership features) and indicates that there is no clear-cut evidence that the more IOF-like co-op models perform better than the more traditional ones.

These results raise the question whether converting into an IOF-like financial structure is indeed profitable to co-ops. As co-ops pursue organizational reforms to attract outside equity, they might also ensure that more capital is available for the funding of strategic investments and competitive strategies. Likewise, their market share may be expanded, their activities in the supply chain may be integrated and better co-ordinated and, hence, their market power may be increased. As a consequence, co-ops may experience better financial viability. Although the arguments for re-engineering their financial/ownership structure are sound, our results indicate that co-ops cannot fully exploit their opportunities by attracting outside equity. This may indicate that re-engineering the financial structure of co-ops should focus on achieving financial viability in the long run by implementing a well-organized strategic marketing plan.

This research focused on the 14 agribusiness co-ops selected on the basis of their turnover. These selected co-ops operate in the same industry but do not operate in the same sectors. Future research may expand the research design of this study by comparing the performance of co-ops across and within sectors. The comparison of co-ops with similar markets and business purposes may reveal useful information regarding the financial viability of the same clusters of co-ops. Furthermore, the comparisons of the performance

of different co-op models within sectors may show what co-op models perform better than others in each sector. The structural and dynamic characteristics of each sector (horticultural vs. dairy) and the relevant market conditions (perfect competitive vs. oligopolistic markets) may influence the financial viability of co-ops over time.

The literature on co-op performance has mainly focused on quantitative data analysis. This research also uses income statements and balance sheets in order to derive relevant accounting data for the calculation of the financial ratios, which allow the comparison of co-ops' financial viability over time. However, such an approach does not take into account qualitative dimensions regarding the strategic behavior of co-ops over time. For instance, co-ops may pursue strategies that do not enhance their financial viability on the short term and, hence, may negatively affect their ranking. Our results do not provide clear-cut evidence supporting the better financial viability of the new IOF-like co-op models. This might be due to the fact that the BoD or professional managers of these co-ops invested the additional capital in new projects. As a result, records on the cash flows which were not available in specific accounting years did not immediately contribute to the financial viability of the examined co-ops. The collection and systematic analysis of qualitative data may allow us to gain crucial insights regarding the strategic behavior of co-ops over time, showing, for example, where the additional capital has been invested and when these investments pay off. A methodological framework is being developed to account for both quantitative and qualitative information regarding the performance of co-op models over time. This framework may enrich our understanding regarding the co-ops' financial viability and strategic behavior over time.

References

AGD (2008). *Belangstelling voor coöperaties neemt toe. Retrieved from the World Wide Web on 17 December 2008.* http://www.agd.nl/1064691/Nieuws/Artikel/Belangstelling-voor-coperaties-neemt-toe.htm

Akridge, J.T., and T.W. Hertel. (1992). Cooperative and Investor-oriented Firm Efficiency: A Multiproduct Analysis. *Journal of Agricultural Cooperation*, Vol. 7, pp. 1-14.

Baourakis, G., Doumpos, M., Kalogeras, N., and Zopounidis, C. (2002). Multicriteria Analysis and Assessment of Financial Viability of Agribusinesses: The Case of Marketing Cooperatives and Juice Producing Companies. *Agribusiness: An International Journal*, Vol. 18, No. 4, pp. 543-558

Barton, D. (1989). What is a Cooperative? In: D. Cobia (Ed.), *Cooperatives in Agriculture*. Englewood Cliffs, NJ: Prentice Hall, pp. 1–20.

Benos, T., Kalogeras, N., Verhees, F.J.H.M, and Pennings, J.M.E. (2009). Marketing Cooperatives' Re-engineering: Influences among Organizational Attributes, Strategic Attributes & Performance. An International Workshop: Rural Cooperation in the 21stCentury: Lessons from the Past, Pathways to the Future. Rehovot, Israel, June 15-17, 2009.

Bijman, J., and Ruben, R. (2005). *Repositioning Agricultural Cooperatives in the North and the South: Where do the Twain meet?* Presentation at Agrifocus Workshop, Deventer.

Bijman, J., and van Bekkum, O-F. (2005). Cooperatives Going Public, Motives, Ownership and Performance. Paper presented at the International Conference on Economics and Management of Networks, EMNet, Budapest, 15 – 17 September, 2005.

Bijman, W.J.J. (2002). *Essays on Agricultural Co-operatives: Governance Structure in Fruit and Vegetable Markets.* ERIM PhD Series Research in Management 15. The Netherlands: Erasmus University Rotterdam.

Brans, J.P., and Vincke, Ph. (1985). A Reference Ranking Organization Method: The PROMETHEE Method for Multiple Criteria Decision-making. *Management Science*, Vol. 31, No. 6, pp. 647-656.

Chaddad, F.R. and Cook, M.L. (2004). Understanding New Cooperative Models: An Ownership-control Rights Typology. *Review of Agricultural Economics*, Vol.26, No. 3, pp. 248-360.

Cook, M.L. and Chaddad, F.R., (2004). Redesigning Cooperative Boundaries: The Emergence of New Models. *American Journal of Agricultural Economics*, Vol. 6, No. 5, pp. 1249-1253.

Cook, M.L., (1997). Organizational Structure and Globalization: the Case of User Oriented Firms. In: Nilsson, J., van Dijk, G. (eds.*) Strategies and Structures in the Agro-food Industries*. Van Gorcum, Assen, Netherlands, pp. 77-93

Declerck, F. (1997). Impact of Mergers and Acquisitions on Structure and Performance in U.S. Food Industries in the 1980s. In Nilsson, J., van Dijk, G. (eds.) *Strategies and Structures in the Agro-food Industries*. Van Gorcum, Assen, Netherlands, pp. 153-170.

Fulton, M.E., & Giannakas, K. (2001). Organizational Commitment in a Mixed Oligopoly: Agricultural Co-operatives and Investor-owned firms. *American Journal of Agricultural Economics*, Vol. 83, No. 5, pp. 1258–1265.

Gentzoglanis, A., (1997). Economic and Financial Performance of Cooperatives and Investor-owned Firms: An Empirical Study. In Nilsson, J., van Dijk, G. (Eds.*) Strategies and Structures in the Agro-food Industries*. Van Gorcum, Assen, Netherlands, pp. 171-182.

Griffioen, C. (2007). Top 30: De Grootste Coöperaties in de Agribusiness, *Coöperatie No. 591*, Juli 2007, pp. 23-25

Hardesty, S. and Salgia, V. (2004). *Comparative Financial Performance of Agricultural Cooperatives and Investor-owned Firms*. Paper presented at NCR-194 Research on Cooperatives Annual Meeting, November 2-3, 2004, Kansas City, Missouri.

Harris, A., and Fulton, M. (1996). Comparative Financial Performance Analysis of Canadian Cooperatives, Investor-owned Firms, and Industry Norms. *Occasional Paper Series*. Saskatoon, Canada: Centre for the Study of Cooperatives.

Harte, L.N. (1997). Creeping Privatisation of Irish Co-operatives: A Transaction Cost Perspective. In Nilsson, J., van Dijk, G. (eds.*) Strategies and Structures in the Agro-food Industries*. Van Gorcum, Assen, Netherlands, pp. 31-53.

Hendrikse, G.W.J. and Veerman, C.P. (2001a). Marketing Cooperatives and Financial Structure: A Transaction Costs Economics Analysis. *Agricultural Economics*, Vo. 26, No.3, pp. 205-216.

Hendrikse, G.W.J., and Veerman, C.P. (2001b). Marketing Cooperatives: An Incomplete Contracting Perspective. *Journal of Agricultural Economics*, Vo. 52, No. 1, pp. 53-64.

Iliopoulos, C. (1998). A Study of the Property Rights Constraints in U.S. Agricultural Cooperatives: Theory and Evidence. Unpublished doctoral dissertation, University of Missouri-Columbia, US.

Kalogeras, N., Baourakis, G., Zopounidis, C., van Dijk, G. (2005). Evaluating the Financial Performance of Agri-food Firms: a Multicriteria Decision-aid Approach. *Journal of Food Engineering*, Vol. 70, No. 5, pp. 365-371.

Kalogeras, N., Pennings, J.M.E., Van der Lans, I.A., Garcia, P., Van Dijk , G. (2009). Understanding Heterogeneous Preferences of Cooperative Members. *Agribusiness: An International Journal*, Vol. 25, No. 1, pp. 90-111.

Kalogeras, N., Pennings, J.M.E., Van Dijk, G., & van der Lans, I.A. (2007). The Structure of Marketing Cooperative: A Members' Perspective. In: K. Karantininis & J. Nilsson (Eds.),*Vertical Markets and Cooperative Hierarchies*, Dordrecht, The Netherlands: Springer Academic Publications, pp. 73–92.

Karantininis, K. and Nilsson, J. (2007). *Vertical Markets and Cooperative Hierarchies: The Role of Cooperatives in the Agro-Food Industry*. Dordrecht, NL: Springer Academic Publications.

Knoeber, C.R., and Baumer, D.L. (1983). Understanding Retained Patronage Refunds in Agricultural Cooperatives. *American Journal of Agricultural Economics*, Vol. 6, No. 3, pp. 30–37.

Kyriakopoulos, K. (2000). *The Market-orientation of Cooperative Organizations: Learning Strategies and Structures for Integrating Firm and Members*. Doctoral dissertation, Nyenrode University, Assen, The Netherlands: van Gorsum.

Lerman, Z. and Parliament, C. (1990). Comparative Performance of Cooperatives and Investor Owned Firms in US Food Industries. *Agribusiness: An International Journal*, Vol. 6, No. 6, pp. 527-540.

Meulenberg, M.T.G. (2000). Voluntary Marketing Institutions in Food Marketing Systems. In: A. Tilburg, H.A.J. van Moll, & A. Kuyvenhoven (Eds.), *Agricultural Markets Beyond Liberalization*, Dordrecht, The Netherlands: Kluwer Academic Publishers, pp. 213–233

Nilsson, J. and Gunnarsson, P. (2000). The PLC co-operatives in the Irish dairy sector, *The World of Co-operative Enterprise 2000.*

Notta, O., and Vlachvei, A. (2007). Performance of Cooperatives and Investor-owned Firms: The Case of the Greek Dairy Industry. In: Karantininis K., and Nilsson, J. (Eds.), *Vertical Markets and Cooperative Hierarchies*, Dordrecht: Springer Academic Publications, pp. 275-285.

Porter, P.K. and Scully, G.W. (1987). Economic Efficiency in Co-operatives. *Journal of Law and Economics*, Vol 30, pp. 489-512.

Roy, B. (1986). Classement et Choix en Présence de Points de vue Multiples : La Méthode ELECTRE. In: *R.I.R.O.*, Vol. 8, pp. 57-75.

Sergaki, P. and Semos, A. (2006). The Greek Unions of Agricultural Cooperatives as Efficient Enterprises. *Agricultural Economics Review*, Vol. 7, No. 2, pp. 15-27

Van Bekkum, O. (2007). Europese Top-100 van Agrifood Coöperaties, *Coöperatie nr. 593*, december 2007, pp. 22-23

Van Bekkum, O.F. and Bijman J. (2006). *Innovations in Cooperative Ownership: Converted and Hybrid Listed Cooperatives*, presented at the 7th international conference on management in agrifood chains and networks, Ede, The Netherlands, 31 May – 2 June 2006.

Van Dijk, G. (1997). Implementing the Sixth Reason for Co-operation: New Generation Co-operatives in Agribusiness. In Nilsson, J., van Dijk, G. (Eds.): *Strategies and Structures in the Agro-food Industries*. Assen: Van Gorcum, pp 94-110

Vitaliano, P. (1983). Cooperative Enterprise: Alternative Conceptual Basis for Analyzing a Complex Institution. *American Journal of Agricultural Economics*, Vol. 65, No. 5, pp.1078–1082

Zopounidis, C., Schiniotakis, N., Baourakis, G., (2006). Financial Analysis and Economic Aspects of the Agricultural Unions of Crete. *Agricultural Economics Review*, Vol. 7, No. 2, pp. 66-74.