

# **Financial Behavior of Cooperatives and Investor-Owned Firms: An Empirical Analysis in the Spanish Fruit and Vegetable Sector**

**MCarmen Martínez Victoria, Narciso Arcas Lario and MLuz Maté Sánchez Val**

**Abstract.** A Partial Adjustment model has been formulated in order to compare the financial ratios between cooperatives and investor-owned firms from a dynamic perspective. Empirical results from a sample of Spanish fruit and vegetable firms during 2009-2012 reveal significant differences in the adjustment process of current and debt ratios between cooperatives and investor-owned firms. These findings may be motivated by the weakness associated with ownership structure in cooperatives that reduces their adjustment processes as compared to investor-owned firms. The identification of differences in adjustment process between cooperatives and investor-owned firms may provide us with additional information about the specific management characteristics of these agri-food firms, identifying more dependent firms to the external market conditions.

## **1. Introduction**

The agri-food sector plays an important role in economic systems, having advantages that are associated with their primary activities. In Europe, this sector, which encompasses agriculture, the food processing industry and related services, contributes six per cent to the European Union Gross Domestic Product (GDP) and provides employment to over forty-eight million European citizens (European Commission, 2012). The independence of agri-food activities from changes in the economic cycle is a result of the majority of products in this sector having inelastic demands: they are staples. Thus, under adverse economic situations, firms specializing in agri-food activities are encouraged to perform a fundamental role: to maintain and even increase employment and to promote economic growth and competitiveness within the country specialized in the primary sector (Crescimanno et al., 2014). Many of these firms are created as cooperatives. These cooperatives in the European Union process and trade approximately 40% of the total

output of the agri-food sector, with this percentage increasing to 46% in the specific case of Spain (Bijman et al., 2012).

Solid arguments justify the existence of cooperative organizations. Previous studies have identified different reasons why economic actors decide to establish cooperatives (Bijman & Hendrikse, 2003; Soboh et al., 2011). The initial argument is that these firms allow individual entrepreneurs to integrate vertically, thereby obtaining lower transaction costs. Thus, there is an improvement in the competitiveness of these firms; reducing the opportunistic behavior caused by asymmetric information between farmers on the one hand, and suppliers of inputs or purchasers of farm products on the other; and improving their own income (Soboh et al., 2009). Therefore, cooperatives are funded to promote member interests; however, these firms also suffer from certain problems, such as unclear property rights (Cook, 1995; Fulton, 1995; Nilsson, 2001). These tend to become more evident during the lifecycle of the cooperatives. As they mature, members tend to have weaker incentives to invest or actively participate in the cooperative (Cook & Iliopoulos, 2000; Nilsson et al., 2012; Valentinov & Iliopoulos, 2012). Consequentially, the financial structure of the cooperatives faces a series of imbalances which tend to place a constraint on the investments of these companies (Cook & Burrell, 2009). From a theoretical perspective, these imbalances are explained by the theory of property rights, the free-rider and the temporal horizon of these investments and the portfolio problems. The first imbalance arises from the collective ownership of the firm's assets and open membership (Royer, 1999). The second refers to the disincentive for cooperative members to invest in long-term projects. This issue occurs when the investment of cooperative members exceeds the time period over which individual members expect to belong to the cooperative (Vitaliano, 1983; Royer, 1999). In this case, members only receive benefits from their investment during the time that they remain within the organization. A third imbalance is caused by collective decisions regarding investments of the firm. Individual members cannot choose their optimal personal investments based on their preferred risk profile (Vitaliano, 1983; Fulton & Giannakas, 2013). Additional problems are caused by restrictions on transferability of residual claimant rights and the lack of liquidity through a secondary market to transfer such rights (Cook & Iliopoulos, 2000). Therefore, the

satisfaction level of cooperative members tends to decrease, along with their willingness to invest over the long-term and to make efficient collective decisions (Cook & Iliopoulos, 2000; Nilsson et al., 2012; Valentinov & Iliopoulos, 2012). Other research has confirmed the influence of free-rider and horizon problems in member behavior (Mínguez-Vera et al., 2010; Arcas-Lario et al., 2013). Such weaknesses inherent to ownership within the cooperative structure forces members to decide whether to exit, continue making changes, or convert it into another business form (Ortmann & King, 2007).

In this context, the question of whether or not the previous singularities are reflected in the financial ratios behavior of cooperatives as compared to investor-owned firms (hereafter IOFs) has been the subject of many studies (Gentzoglanis, 1997; Hardesty & Salgia, 2004). However, these papers do not present general results; rather, they depend on the analyses of individual firm characteristics. In this sense, Hind (1999) suggests that in the last stages of cooperative lifecycles, these firms tend to be more akin to IOFs than traditional cooperatives since they tend to relax their limitations of residual claims (Chaddad & Cook, 2004). Chaddad and Iliopoulos (2013) also analyze three different models adopted by cooperatives with structures based on different degrees of constraint of ownership rights. They reveal that each structure reflects a series of advantages and drawbacks. For example, to reduce the degree of member control, cooperatives lose by incurring additional monitoring costs, but gain in terms of lower decision-making costs.

Regarding previous studies, the question of whether cooperatives perform like their IOF counterparts remains open. In this context, the objective of this article is to contribute to this ongoing discussion by providing evidence that compares the financial behavior of cooperatives and IOFs. To achieve this purpose, we propose a dynamic partial adjustment model (PAM) to compare the financial behavior of both firm types.

This model assumes that firms, after receiving external shocks, adjust their financial ratios to certain targets which are represented by the sectorial average values (Lev, 1969). Differences in adjustment process between cooperatives and IOFs will provide us with additional information on the specific management characteristics of these firms, identifying the more dependent

enterprises to the external market shocks and their characteristics. Many studies have concluded that the democratic control structure as well as the limited access to equity capital affects the structure of cooperatives as compared to IOFs. However, they have not considered how cooperative structures address external market conditions. In this sense, in the face of external shocks, firms having quicker reactions to adjust their financial magnitudes to the sectorial average values are more influenced by market conditions. This is a useful finding in order to understand and predict the financial behavior of firms when financial policies are designed to promote agri-food firms.

Our empirical application is based on a sample of 8,353 Spanish fruit and vegetable firms during the period of 2009-2012. The importance, in economic and production terms, of this large subsector within the agri-food sector serves as justification for this study. The fruit and vegetable share represents 39% of all final agricultural production, accounting for 59% of crop production. Employment in the fruit and vegetable sector accounts for 50% of agricultural employment, with 400,000 workers (MERCASA, 2014<sup>1</sup>).

Based on this information, we test the results for three financial ratios, each representing a different financial dimension of the enterprise: liquidity, indebtedness and profitability. While profitability has been analyzed from distinct perspectives, liquidity and indebtedness have not been previously studied in cooperatives from a dynamic approach (Boyle, 2004; Notta & Vlachvei, 2007; Soboh et al., 2011; Hirsch & Hartmann 2014). The estimation of the PAM for each financial ratio is based on the Generalized Method of Moments (GMM), applied to estimate a dynamic panel specification. Our results determine a general adjustment in the financial ratios of the overall sample, finding lower rates of adjustment in cooperatives than in IOFs for current and debt ratios. These results may be caused by weakness associated with ownership structure in cooperatives that reduces their adjustment processes as compared to investor-owned firms. Finally, we did not find significant differences in the adjustment process of the return on assets

ratios between these firm types.

## **2. Financial Performance of Cooperative Firms**

The operating methods used by cooperatives are responsible for their differing financial results in comparison with IOFs. Unlike IOFs, cooperatives operate under a set of constraints (free rider, horizon and portfolio issues) derived from the different goals of the economic agents and their perceived self-interest (Borgen, 2004).

As the cooperative grows, separation between owner and management functions emerge and agency problems tend to appear (Jensen & Meckling, 1976; Cook, 1995). This growth brings conflicts into the management of these firms, leading to differences between the financial objectives of cooperatives and IOFs. There is substantial literature that analyses the financial behavior of cooperatives and compares their results with those of IOFs. These analyses considered the different financial dimensions of the firm. According to Soboh et al. (2009), the financial dimensions are classified in two categories: first, liquidity and indebtedness are examined to assess the firm's ability to pay its current obligations when they are due as well as the nature of any financing equity. Second, profitability is considered to evaluate the firm's ability to generate earnings.

With respect to the firm's liquidity, some studies have concluded that cooperatives have lower liquidity ratios than IOFs (Royer, 1991; Gentzoglani, 1997; Fazzini & Russo, 2014). These studies suggest that the pressure exerted by the members of the cooperative to maximize their product prices may cause these firms to adjust their cash budgeting (Hardesty & Salgia, 2004). Other studies imply that cooperatives over-invest in their total assets in comparison with IOFs; this results in a higher level of inventories and a reduced liquidity (Lerman & Parliament, 1990; Gentzoglani, 1997). Finally, other studies have had inconclusive results about the differences between cooperatives and IOFs in terms of liquidity (Parliament et al., 1990; Hardesty & Salgia, 2004; Soboh et al., 2011). These studies suggest that the industry and size of the enterprise influence liquidity levels and may cause differences between cooperatives and IOFs.

Relative to the indebtedness of the firm, there are studies which conclude that cooperatives have higher indebtedness ratios than IOFs (Venieris, 1989; Lerman & Parliament, 1990; Gentzoglanis, 1997). According to these analyses, cooperatives have more financial incentives to increase their capital because of their members' disincentive to invest. This is related to the free rider problem in cooperatives, as new members receive the same rights as existing members and can take advantage of prior investments made by former members (Fulton, 1995; Cook, 1995). However, there are also empirical studies showing that cooperatives have lower indebtedness values than IOFs. This may be explained by the horizon issue. According to this principle, members of a cooperative are resistant to long-term financing since they do not want to commit to an investment that will not provide them with any returns. They are more likely to pursue short-term goals. Therefore, cooperatives adopt a conservative perspective by taking fewer risks and using retained profits instead of debt financing (Soboh et al., 2011).

When examining the profitability dimension, we find several studies confirming that cooperatives have lower profitability values than IOFs (Notta & Vlachvei, 2007; Soboh et al., 2011). The authors explain this difference by examining the objectives of the cooperatives: to maximize the benefits and welfare of their members. From previous literature we learn that cooperatives seek to maximize profits by increasing the prices of their members' products as much as possible (Guzmán & Arcas, 2008; Soboh et al., 2009, 2012; Hernández-Espallardo et al., 2013). Thus, cooperatives are expected to have lower profitability values because they increase the cost of the purchased products to their supplier-members and pay out part of their profit in the price. This practice tends to lower the cooperative's profitability as compared to that of the IOFs (Soboh et al., 2009, 2012).

Analyses have also concluded that cooperatives are not less profitable than IOFs (Lerman & Parliament, 1990; Gentzoglanis, 1997; Hardesty & Salgia, 2004; Boyle, 2004). According to these studies, both types of firms present similar behavior in the profitability dimension. Boyle (2004) confirms that the similar behavior occurs because cooperatives do not establish their prices at the maximum value, as IOFs firms do. Hardesty and Salgia (2004) suggest that the variety of results

may be generated by the characteristics of each industry -- dairy, fruit and vegetables, grain and farm supply -- in which cooperatives and IOFs operate.

Prior studies have evaluated the performance of cooperatives as compared to IOFs, analyzing their financial ratios (Gentzoglanis, 1997; Hardesty & Salgia, 2004; Notta & Vlachvei, 2007; Fazzini & Russo, 2014). However, they do not reveal a clear pattern of behavior in their financial ratios. Furthermore, it is important to consider that the samples of these studies come from different countries and industries, and also the institutional conditions may be quite different.

#### **4. Data, Variables and Methodology**

##### *4.1. Data*

The financial and accounting data applied in our empirical application was obtained from the SABI (Iberian Balance Analysis System) database, which provides a wide range of information about distinct business characteristics of Spanish firms. We selected Spanish fruit and vegetable firms based on the criterion established in the National Classification of Economics Activities (NACE, 2007). The fruit and vegetable sector<sup>2</sup> is the largest agricultural sector in terms of output value in the EU-27 and Spain. Furthermore, in Spain, cooperatives operating in this subsector are the most important, both in number and turnover, representing approximately 24% of the 3,838 Spanish cooperatives and 26,183 million Euros in turnover (OSCAE, 2014)<sup>3</sup>.

Once we obtained all of the information, we eliminated the observations from firms having anomalies in their financial statements, e.g., negative values in their sales or assets that distort the behavior of the firms. Furthermore, to reduce the effect of outliers in our sample, we dropped extreme values in all of the variables that were not included in the  $\pm 3$  interquartile range. Finally, our sample is composed of 8,353 firms, of which 249 are cooperatives and 8,104 are IOFs. We have information on these firms for the period 2009-2012.

---

<sup>2</sup> Our sample encompasses agriculture, the food processing industry and related services.

#### 4.2. Variables

Based on previous literature, we selected a financial ratio that is representative of each financial dimension of the firm (Gallizo et al., 2008; Soboh et al., 2009; Maté et al., 2012) (see Table 1). In addition, in order to provide robustness to our results, we considered alternative definitions of financial ratios in each dimension. The results that were obtained are similar when we consider different financial ratios of each dimension.

----- T1-----

Table 1 describes the financial ratios and the correlation between them<sup>4</sup>. The results in Panel B agree with previous literature. In this sense, we found a negative relationship between current and debt ratios, which shows the substitution effect of liquidity-debt (Faulkender & Wang, 2006; Pinkowitz et al., 2006; Acharya et al., 2007). According to previous studies, firms tend to apply an excess of liquidity to reduce external debt and, therefore, it is expected that a negative relationship shall exist between these ratios. The negative relationship between return on assets and debt ratios is explained by the application of the profits to reduce a firm's dependence on external debt (Sankay et al., 2013). Finally, a firm with greater profitability tends to present higher liquidity values (Gallizo et al., 2008; Maté et al., 2012).

#### 4.3. Control variables

Apart from financial ratios, we used different control variables to consider the characteristics of each enterprise. Thus, we built the variable cooperative as a dummy variable, which takes the value of "1" if the analyzed firm is cooperative<sup>5</sup> and "0" otherwise. Moreover, we define the age and the size of the firm by establishing different categories for each variable. Following Berger and Udell (1998), we establish four groups of firms according to their ages: infant (0 to 2 years), adolescent (3 to 4 years), middle-aged (5 to 24 years), and old (more than 25 years). Each stage of the life determines the nature of the firm's financial needs and available resources (La Rocca

---

<sup>4</sup>Given that we have information for the 2009-2012 period, to analyze the correlations we compute temporal average values for all financial ratios in order to get more consistent results.

<sup>5</sup>The companies whose legal form is classified as cooperative businesses in the SABI database.

et al., 2011). Despite the lack of comprehensive information regarding younger firms in the market, it is seen that infant and adolescent firms share specific capital structures and more constrained market strategies than older firms. In this sense, some studies suggest that the firm's financial constraints tend to be more severe in their early stages of their existence (Oliveira & Fortunato, 2006). Thus, the age of the cooperatives and IOFs are considered to be a relevant factor in the firm's financing behavior (La Rocca et al., 2011; Sánchez-Vidal & Martín-Ugedo, 2012). Alternatively, size is an indicator of the dimension of the firm. This variable is based on the number of employees. Based on this information, we have followed the European Commission Recommendation of 6 May 2003 (2003/361/CE), to establish different groups: "Micro" refers to firms with fewer than 10 workers. "Small" defines the set of firms having from 11 to 50 employees. "Medium" firms employ between 50 and 250 workers. And finally, "Large" firms operate with more than 250 employees.

Literature highlights the relationship between company size and financial ratios. Specifically, some studies have shown a positive effect of size on the firm's financial behavior. Larger companies are able to take better advantage of economies of scale, concerning operating costs of innovation. These companies have a greater possibility for diversification activities and success in the face of potential market changes (Serrasqueiro & Nunes, 2008). Therefore, firm size is a variable to be considered when financial analysis is carried out. Table 2 below shows the distribution of our sample in function of these variables.

-----T2-----

In general terms, the distribution of the sample in categories related to the age and the size of the firm is in accordance with the distribution of the population (DIRCE, 2012) (Central Directory of Companies). There are only two exceptions, infant for age and large firms for size. In these categories there is no representative number of companies according to the composition of the global population. Due to the scarce number of firms in these categories and in order to maintain the maximum number of firms, we have grouped these categories joining large with medium and infant with adolescent.

## **5. Empirical Results**

### 5.1. Static analysis

This section presents a static comparison of the financial ratios of cooperatives and IOFs. For this purpose, we compute average values of the different financial ratios for each year and test significant differences amongst the firms. Table 3 shows these results:

T3

Table 3 indicates that there are only minor differences existing between cooperatives and IOFs when current ratios are considered. However, we found significant differences when debt and return on assets ratios were compared. These results are in accordance with previous studies, which suggest that the behavior of the current ratios of cooperatives is similar to that of IOFs (Lerman & Parliament, 1990, 1991; Hardesty & Salgia, 2004). These studies state that the main differences in the liquidity values among firms are explained by the type of subsector of production and its size. Moreover, this result reveals that cooperatives attempt to adopt a safe stance in order to protect the firm against the risk of defaulting on current obligations (Oustapassidis et al., 1998).

As for the debt ratio, cooperatives tend to adopt a more conservative structure having less debt. The ability of cooperatives to have access to sufficient capital for their operations is consistently a major problem (Cook & Iliopoulos, 2000; Chaddad et al., 2005; Nilsson et al., 2012). The opportunistic behavior of their members prevents them from taking on a great deal of external debt. In this sense, the horizon problem reduces investment in projects that generate long-term benefits, and encourages investments having a short payoff horizon (Borgen, 2004; Fulton & Giannakas, 2013). These cooperatives, in which members are averse to taking on unnecessary risk, prefer to use retained earnings instead of external debt to finance their investments.

With regards to the return on assets ratio, we found significant differences in cooperatives with lower values as compared to IOFs. This may be explained by the internal management of the cooperatives, which seek to maximize the interests of their members (Soboh et al., 2011). In contrast to IOFs, cooperatives do not focus on the maximization of their profits, but instead, on

the satisfaction of their members. Thus, cooperatives tend to distribute benefits amongst their members via prices, offering higher selling prices to their suppliers, who are also members (Hernández-Espallardo et al., 2013). This pricing policy of adjustment via prices tends to lower their profitability ratios as compared to the IOFs.

## 5.2. *Dynamic analysis*

Table 4 presents the results for GMM system estimation and the associated specification tests.

### T4

In the first-differenced equations, we consider three-times lagged values of the financial ratios for cooperatives and IOFs as instruments. Instruments in the GMM system estimation for equations in levels are time-invariant variables (size and age) and twice-lagged values of the financial ratios for cooperatives and IOFs. The Hansen test of over-identifying restrictions does not negate the validity of the instruments for GMM systems in all cases. Arellano–Bond autocorrelation tests applied to the differenced residuals of the GMM models indicate that there are no problems with the serial correlation in levels, given that the AR (2) tests are insignificant. Finally, the Wald test validates the overall significance of the model.

As seen in Table 4, in all of the financial ratios, there is an adjustment process toward the average value. The results show significant differences between cooperatives and IOFs for current and debt ratios. However, the return on assets ratio indicates an adjustment process in cooperatives similar to that in IOFs. This occurs even though cooperatives tend to be subject to some characteristics as maximize the prices of their members and their welfare and also, some limitations associated to their ownership rights. In general terms, our findings demonstrate that cooperatives often tend to behave as IOFs do, adjusting their coefficients toward the sectorial average to withstand external shocks in the market.

However, the speeds of adjustment mark the primary difference between cooperatives and IOFs. The lower rate of adjustment for current and debt ratios suggests higher readjustment costs in

cooperatives. There are significant differences between the speed of adjustment in the current ratio of cooperatives and IOFs. In the case of cooperatives, members are less willing to acquire long-term responsibilities, so they try to offset their short-term liquidity needs by using their lower leverage. On the one hand, current ratios above the average value may reduce the cooperative's efficiency and cause a general unrest among members. In this sense, it is necessary to highlight that the trust and welfare of members are factors that influence the cooperative's performance. On the other hand, current ratios below the average value could reduce the cooperative's solvency and constrain their current operations (Soboh et al., 2012; Arcas et al., 2013).

As for debt ratio, when cooperatives deviate from their target debt values, they do not tend to fully adjust to the equilibrium. This process of adjustment may be difficult when it becomes necessary given that the debt level is sufficiently below the target capital structure (Drobetz & Wanzenried, 2006). Furthermore, this low coefficient suggests that cooperatives tend to rely less on external funding and to obtain resources through retained profits. From the internal perspective, some members of the cooperative are resistant to using investment capital to restructure the cooperative's finances since they receive zero returns from such investments (Soboh et al., 2011). From an external point of view, cooperatives have financial constraints to raise capital (Chaddad et al., 2005). These factors cause cooperatives to have a lower adjustment capacity in their financial structure than IOFs, which tends to face their financial needs by raising new debt and equity in order to maintain an optimal level of leverage (Oustapassidis et al., 1998).

Finally, our results indicate that the return on assets ratios in cooperatives and IOFs approaches their target values with a high degree of adjustment. Cooperatives and IOFs have similar results even though they operate under different conditions (Nilsson et al., 2012). IOFs are subordinated to the financial demands of the stakeholders, who have invested money to earn capital returns, whereas cooperatives have more objectives intended to satisfy member preferences. This high speed of adjustment could actually be accelerated by modifying some of the characteristics of the cooperative. For example, cooperatives tend to be undercapitalized due to internal financial constraints. However, members are free to use their excess profits to invest in the cooperative

itself. In addition, cooperatives pay out the majority of their profits to their members via maximization of the prices to the suppliers-members (Soboh et al., 2009, 2012). If these established prices suggest that cooperatives pay at a lower price than the prices they would pay to their producers, this may decrease satisfaction among members and affect the cooperative's adjustment process (Hernández-Espallardo et al., 2013).

In addition to these variables, we also included several control dummy variables in the model: age and size. As for age, the current ratio is lower for adolescent and middle-aged companies. The opposite occurs with debt and return on assets ratios. This result is in line with previous literature that indicates that younger companies tend to be more financially constrained (Oliveira & Fortunato, 2006). Company size is also a significant variable in this analysis but only for the return on assets ratio having a negative sign in relation to the category of reference, larger firms. Therefore, the return on assets ratio is lower for smaller firms. This result is in accordance with prior studies that have suggested that larger firms tend to be more profitable since they are associated with economies of scale and greater diversification activities (Serrasqueiro & Nunes, 2008).

## **6. Discussion**

Regarding property rights, much has been written regarding problems plaguing cooperatives. These business structures have been criticized due to the capital constraints that tend to emerge as they grow in the markets (Cook, 1995; Cook & Burrell, 2009; Feng et al., 2016). One of the questions that continue to intrigue researchers is whether or not common structural problems associated with these firms cause cooperatives to perform worse than IOFs. Especially problematic for cooperatives are the free-rider, horizon and portfolio issues. Because of these problems, many cooperatives become IOFs or liquidate

T5

Table 5 summarizes the main results of this paper. As the Cook study (1995) highlights, cooperatives do not experience static financial behavior but rather, their financial needs change in each stage. Thus, our study attempts to capture the financial behavior of cooperatives and IOFs

from a dynamic perspective. Previous studies analyzing cooperatives performance using financial ratios tend to examine them from a static approach (Lerman & Parliament, 1990; Gentzoglanis, 1997; Hardesty & Salgia, 2004; Notta & Vlachvei, 2007; Hirsch & Hartmann, 2014; see Section 2 for more studies). According to these studies, there is no clear evidence supporting the theory that IOFs perform better than cooperatives. It is true that throughout their existence, cooperatives may face problems associated with their rights issues, but their structures may also provide benefits that are not available to IOFs (e.g., social cohesion of their membership--values of solidarity, trust, fairness, etc.--). Based on our results, we conclude that although generally speaking, cooperatives behave like IOFs, certain financial dimensions of cooperatives are more influenced by market forces than IOFs. This higher sensibility to external market shocks is related to the specific management of each cooperative, their objectives and the commitment of their members.

## **7. Conclusions**

Based on a dynamic perspective, we have analyzed the financial behavior in the current, debt and return on assets ratios for Spanish fruit and vegetable cooperatives versus IOFs. Applying the PAM based on GMM methodology, we have confirmed that Spanish fruit and vegetable cooperatives tend to adjust their financial ratios toward average values with certain differences in the speed of their adjustments. Specifically, we find slower speeds of adjustment in the current and debt ratios for cooperatives, while return on assets has a higher speed of adjustment for both cooperatives and IOFs, without significant differences.

Our study provides a comparison and offers greater understanding of the behavior of Spanish fruit and vegetable cooperatives, particularly the characteristics of their management systems and property right theory. The financial ratios analyzed from a static perspective do not permit clear conclusions about the dynamic behavior of the financial structure of cooperatives. Our paper shows how cooperatives react in the face of external market shocks as compared to IOFs. Therefore, this study demonstrates how important it is to consider different perspectives of analysis, static as well as dynamic, when comparing cooperatives with IOFs.

Our findings may be useful for stakeholders in order to analyze and understand the financial state of cooperatives. Furthermore, this study opens up a new field for further research. Using this dynamic perspective, it is possible to evaluate how the financial decisions of the firm react to market conditions and how external shocks may affect the internal management of the cooperative as compared with that of IOFs. In the face of external shocks, firms having quicker reactions to adjust their financial magnitudes to the sectorial average values have more internal incentives to readjust their financial magnitudes. These firms shall be more dependent on external market characteristics. This is a useful finding in order to understand and predict the firms' financial behavior when financial management policies are designed to promote agri-food firms' results. Future research in this area should consider other scenarios and different cooperative cultures.

## References

- Acharya, V.V., Almeida, H., & Campello, M. (2007). Is cash negative debt? A hedging perspective on corporate financial policies. *Journal of Financial Intermediation*, 16(4), 515-554.
- Arcas-Lario, N., Martín-Ugedo, J.F., & Mínguez-Vera, A. (2013). Members' satisfaction with agricultural cooperatives. An explanation from Property Rights Theory. *ITEA-Información Técnica Económica Agraria*, 109(4), 443-457.
- Berger, A.N., & Udell, G.F. (1998). The economics of small business finance: The roles of private equity and debt markets in the financial growth cycle. *Journal of Banking & Finance*, 22 (6-8), 613-673.
- Bijman, J., & Hendrikse, G.W.J. (2003). Co-operatives in chains: institutional restructuring in the Dutch fruit and vegetable industry. *Journal on Chain and Network Science*, 3(2), 95-107.
- Bijman, J., Iliopoulos, C., Poppe, K. J., Gijselinckx, C., Hagedorn, K., Hanisch, M., Hendrikse, G.W.J., Kühl, R., Ollila, P., Pyykkönen, P., & Ger Van Der Sangen. (2012). Support for Farmers' Cooperatives. Final Report, Wageningen UR.
- Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics*, 87(1), 115-143.
- Boland, M., & Barton, D. (2013). Overview of Research on Cooperative Finance. *Journal of Cooperatives*, 27, 1-14.
- Borgen, S.O. (2004). Re-thinking incentive problems in co-operative organizations. *The Journal of Socio-Economics*, 33(4), 383–393.
- Boyle, G.E. (2004). The economic efficiency of Irish dairy marketing cooperatives. *Agribusiness*, 20(2), 143-153.
- Chaddad, F.R., & Cook, M.L. (2004). Understanding new cooperative models: An ownership-control rights typology. *Review of Agricultural Economics*, 26(3), 348–360.

- Chaddad, F.R., Cook, M.L., & Heckelei, T. (2005). Testing for the presence of financial constraints in US agricultural cooperatives: an investment behaviour approach. *Journal of Agricultural Economics*, 56(3), 385-397.
- Chaddad, F.R., & Iliopoulos, C. (2013). Control rights, governance, and the costs of ownership in agricultural cooperatives. *Agribusiness*, 29(1), 3-22.
- Chen, C.R., & Ainina, F. (1994). Financial ratio adjustment dynamics and interest rate expectations. *Journal of Business Finance & Accounting*, 21(8), 11-26.
- Cook, M.L. (1995). The future of US agricultural cooperatives: A neo-institutional approach. *American Journal of Agricultural Economics*, 77(5), 1153-1159.
- Cook, M.L., & Iliopoulos, C. (2000). Defined property rights in collective actions: The case of US agricultural cooperatives. In Ménard, C. (Ed.), *Institutions, Contracts and Organization: Perspectives from New Institutional Economic* (pp. 335-348). London: Edward Elgar Publishing.
- Cook, M.L., & Burrell, M.J. (2009). A cooperative life cycle framework. Paper presented at the International Conference "Rural Cooperation in the 21<sup>st</sup> Century: Lessons from the Past, Pathways to the Future," The Hebrew University of Jerusalem, Rehovot, Israel.
- Crescimanno, M., Galati, A., & Bal, T. (2014). The role of the economic crisis on the competitiveness of the agri-food sector in the main Mediterranean countries. *Agricultural Economics*, 60(2), 49-64.
- Dang, V.A., Kim, M., & Shin, Y. (2012). Asymmetric capital structure adjustments: New evidence from dynamic panel threshold models. *Journal of Empirical Finance*, 19(4), 465-482.
- Davidson, R., & MacKinnon, J. (2004). *Econometric Theory and Methods*. Oxford University Press.
- Davis, H.Z., & Peles, Y.C., (1993). Measuring equilibrating forces of financial ratios. *The Accounting Review*, 68(4), 725-747.

- Drobetz, W., & Wanzenried, G. (2006). What determines the speed of adjustment to the target capital structure? *Applied Financial Economics*, 16(13), 941-958.
- European Commission. (2014). High level forum for a better functioning food supply chain. Report EU Press.
- Fama, E.F., & French, K.R. (2002). Testing trade-off and pecking order predictions about dividends and debt. *Review of financial studies*, 15(1), 1-33.
- Faulkender, M., Flannery, M.J., Hankins, K.W., & Smith, J.M. (2012). Cash flows and leverage adjustments. *Journal of Financial Economics*, 103(3), 632-646.
- Faulkender, M., & Wang, R. (2006). Corporate financial policy and the value of cash. *Journal of Finance*, 61(4), 1957-1990.
- Fazzini, M., & Russo, A. (2014). Profitability in the Italian Wine Sector: An Empirical Analysis of Cooperatives and investor-owned firms. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 4(3), 130-137.
- Feng, L., Friis, A., & Nilsson, J. (2016). Social capital among members in grain marketing cooperatives of different sizes. *Agribusiness*, 32(1), 113-126.
- Fulton, M. (1995). The Future of Canadian Agricultural Cooperatives: A Property Rights Approach. *American Journal of Agricultural Economics*, 77(5), 1144-1152.
- Fulton, M., & Giannakas, K. (2013). The future of agricultural cooperatives. *Annual Review of Resources Economics*, 5(1), 61-91.
- Gallizo, J.L., & Salvador, M. (2000). Medida del proceso de ajuste de los ratios financieros. Un análisis en sectores industriales. *Revista Española de Financiación y Contabilidad*, 29(103), 37-56.
- Gallizo, J.L., & Salvador, M. (2003). What factors drive and which act as a brake on the convergence of financial statements in EMU member countries? *Review of Accounting & Finance*, 1(4), 49-68.

- Gallizo, J.L., Gargallo, P., & Salvador, M. (2008). Multivariate partial adjustment of financial ratios: a Bayesian hierarchical approach. *Journal of Applied Econometrics*, 23(1), 46-64.
- Gentzoglanis, A. (1997). 10 Economic and financial performance of cooperatives and investor-owned firms: an empirical study. In Nilsson, J. and Van Dijk, G. (Ed.), *Strategies and Structures in the Agro-Food Industries* (pp. 171-183). Netherlands: Van Gorcum and Comp.
- Greene, W.H. (2008). *Econometric Analysis*. New York: Prentice Hall.
- Guzmán, I., & Arcas, N. (2008). The usefulness of accounting information in the measurement of technical efficiency in agricultural cooperatives. *Annals of Public and Cooperative Economics*, 79(1), 107-131.
- Hall, A. (2005) *Generalized Method of Moments*, Oxford University Press.
- Hansen, L.P. (1982). Large Sample Properties of Generalized Method of Moments Estimators. *Econometrica: Journal of Econometric Society*, 50(4), 1029-1054.
- Hansmann, H. (1996). *The ownership of enterprise*. Cambridge: The Belknap of Harvard University Press.
- Hardesty, S., & Salgia, V. (2004). *Comparative Financial Performance of Agricultural Cooperatives and Investor-Owned Firms*. Paper presented at the NCR-194 Research on Cooperatives Annual Meeting, Kansas.
- Hernández-Espallardo, M., Arcas-Lario, N., & Marcos-Matás, G. (2013). Farmers' satisfaction and intention to continue membership in agricultural marketing cooperatives: Neoclassical versus transaction cost considerations. *European Review of Agricultural Economics*, 40(2), 239-260.
- Hind, A. (1999). Co-operative life cycle and goals. *Journal of Agricultural Economics*, 50(3), 536-548.
- Hirsch, S., & Gschwandtner, A. (2013). Profit persistence in the food industry: evidence from five European countries. *European Review of Agricultural Economics*, 40(5), 741-759.

- Hirsch, S., & Hartmann, M. (2014). Persistence of firm-level profitability in the European dairy processing industry. *Agricultural Economics*, 45(Supplement1), 53-63.
- Kalogeras, N., Pennings, J.M.E., Benos, T., & Doumpos, M. (2013). Which cooperative ownership model performs better? A financial-decision aid approach. *Agribusiness*, 29(1), 80-95.
- Jensen, M.C., & Meckling, W.H. (1976). Theory of the firm: managerial behavior, agency costs and ownership structure. *Journal of Financial Economics*, 3(4), 305–360.
- La Rocca, M., La Rocca, T., & Cariola, A. (2011). Capital structure decisions during a firm's life cycle. *Small Business Economics*, 37(1), 107-130.
- Lee, C.F., & Wu, C. (1988). Expectation formation and financial ratios adjustment processes. *Accounting Review*, 63(2), 292-306.
- Lerman, Z., & Parliament, C. (1990). Comparative performance of cooperatives and investor-owned firms in US food industries. *Agribusiness*, 6(6), 527-540.
- Lerman, Z., & Parliament, C. (1991). Size and industry effects in the performance of agricultural cooperatives. *Agricultural Economics*, 6(1), 15-29.
- Lev, B. (1969). Industry averages as targets for financial ratios. *Journal of Accounting Research*, 7(2), 290-299.
- Maté, M.L., López, F., & Mur, J. (2012). Analysing long-term average adjustment of financial ratios with spatial interactions. *Economic Modelling*, 29(4), 1370-1376.
- Mínguez-Vera, A., Martín-Ugedo, J.F., & Arcas-Lario, N. (2010). Agency and property rights theories in agricultural cooperatives: evidence from Spain. *Spanish Journal of Agricultural Research*, 8(4), 908-924.
- Modigliani, F., & Miller, M.H. (1958). The cost of capital, corporation finance and the theory of investment. *The American Economic Review*, 48(3), 261-297.

- Nilsson, J. (2001). Organisational principles for co-operative firms. *Scandinavian Journal of Management*, 17(3), 329-356.
- Nilsson, J. (1996). The nature of cooperative values and principles. Transaction cost theoretical explanations. *Annals of Public and Cooperative Economics*, 67(4), 633-653.
- Nilsson, J., Svendsen, G.L.H., & Svendsen, G.T. (2012). Are large and complex agricultural cooperatives losing their social capital? *Agribusiness*, 28(2), 187-204.
- Notta, O., & Vlachvei., A. (2007). Performance of Cooperatives and Investor-Owned Firms: The Case of the Greek Dairy Industry. In Karantininis, K. and Nilsson, J. (Ed.), *Vertical Markets and Cooperative Hierarchies The Role of Cooperatives in the Agri-Food Industry* (pp. 277-287). Dordrecht: Springer Academic Publishers.
- Ortmann, G.F., & King, R.P. (2007). Agricultural cooperatives I: history, theory and problems. *Agrekon*, 46(1), 40–68.
- Oustapassidis, K., Vlachvei, A., & Karantininis, K. (1998). Growth of investor owned and cooperative firms in Greek dairy industry. *Annals of Public and Cooperative Economics*, 69(3), 399-417.
- Parliament, C., Lerman, Z., & Fulton, J. (1990). Performance of cooperatives and investor-owned firms in the dairy industry. *Journal of Agricultural Cooperation*, 5, 1-16.
- Peles, Y., & Schneller, M. (1989). The duration of the adjustment process of financial ratios. *The Review of Economics and Statistics*, 71(3), 527-532.
- Pinkowitz, L., Stulz, R., & Williamson, R. (2006). Does the contribution of corporate cash holding and dividends to firm value depend on governance? A cross-country analysis. *Journal of Finance*, 61(6), 2725-2751.
- Royer, J.S. (1999). Cooperative organizational strategies: A neo-institutional digest. *Journal of Cooperatives*, 14, 44–67.

- Royer, J.S. (1991). A comparative financial ratio analysis of US farmer cooperatives using non-parametric statistics. *Journal of Agricultural Cooperation*, 6, 22-44
- Sánchez-Vidal, J., & Martín-Ugedo, J.F. (2012). Are the implications of the financial growth cycle confirmed for Spanish SMEs? *Journal of Business Economics and Management*, 13(4), 637-665.
- Sankay, O., Clement, A., & Funke, A. (2013). Profitability and debt capital decision: a reconsideration of the pecking order model. *International Journal of Business and Management*, 8(13), 24-33.
- Soboh, R., Lansink, A.O., Giensen, G., & Van Dijk, G. (2009). Performance measurement of the agricultural marketing cooperatives: The gap between theory and practice. *Review of Agricultural Economics*, 31(3), 446-469.
- Soboh, R., Lansink, A.O., & Van Dijk, G. (2011). Distinguishing dairy cooperatives from investor-owned firms in Europe using financial indicators. *Agribusiness*, 27(1), 34-46.
- Soboh, R., Lansink, A.O., & Van Dijk, G. (2012). Efficiency of cooperatives and investor-owned firms revisited. *Journal of Agricultural Economics*, 63(1), 142-157.
- Valentinov, V. (2007). Why are cooperatives important in agriculture? An organizational economics perspective. *Journal of Institutional Economics*, 3(1), 55-69.
- Valentinov, V., & Iliopoulos, C. (2012). Property Rights Problems in Agricultural Cooperatives: A Heterodox Institutional Perspective. *Journal of International Agricultural Trade and Development*, 61(3), 139-147.
- Venieris, G.J. (1989). Agricultural Cooperatives vs. Public Firms in the Greek Wine Industry. *European Review of Agricultural Economics*, 16(1), 129-135.
- Vitaliano, P. (1983). Cooperative enterprise: an alternative conceptual basis for analyzing a complex institution. *American Journal of Agricultural Economics*, 65(5), 1078-1083.

Wu, C., & Ho, S.K. (1997). Financial ratios adjustment: industry-wide effects on strategic management. *Review of Quantitative Finance and Accounting*, 9(1), 71-88.

**Table 1. Financial Ratios**

<i>Panel A: Financial ratios</i>			
<i>Dimension</i>	<i>Ratio</i>	<i>Measurement</i>	
Liquidity	Current	Current assets to current liabilities	
Indebtedness	Debt	Total liabilities to total assets	
Profitability	Return on assets	Earnings before interest and taxes to total assets	
<i>Panel B: Partial correlation among financial ratios</i>			
<i>Ratios</i>	<i>Current</i>	<i>Debt</i>	<i>Return on assets</i>
<i>Current</i>	1	-	-
<i>Debt</i>	-0.471*** (0.000)	1	-
<i>Return on assets</i>	0.153*** (0.000)	-0.154*** (0.000)	1
<i>p-value in parenthesis. (*) significant at 10% (**) significant at 5% (***) significant at 1%.</i>			

**Table 2. Distribution of the sample in function of age and size**

	<i>Total</i>	<i>Co-ops (%)</i>	<i>IOFs (%)</i>
<b><i>Panel A: Age</i></b>			
<i>Infant</i>	0	0	0
<i>Adolescent</i>	127	0.40	1.55
<i>Middle-Aged</i>	6.776	53.01	81.98
<i>Old</i>	1.450	48.58	16.46
<b><i>Panel B: Size</i></b>			
<i>Micro</i>	6.098	57.43	73.48
<i>Small</i>	1.812	24.50	21.60
<i>Medium</i>	375	13.25	4.22
<i>Large</i>	68	4.81	0.69

**Table 3. Comparison between cooperatives and IOFs**

<i>Panel A: Annual description of financial ratios</i>					
<i>Financial Ratio</i>		<i>2009</i>	<i>2010</i>	<i>2011</i>	<i>2012</i>
Current	Mean co-ops	1.321	1.307	1.312	1.296
	Mean IOFs	1.276	1.300	1.313	1.348
Debt	t-test <sup>(1)</sup>	0.877	0.128	-0.026	-1.172
		(0.380)	(0.898)	(0.979)	(0.242)
Return on assets	Mean co-ops	0.624	0.624	0.627	0.620
	Mean IOFs	0.688	0.681	0.670	0.662
Test	t-test	-0.427	-3.383	-2.542	-2.400
		(0.000)***	(0.001)***	(0.011)*	(0.016)**
Test	Mean co-ops	0.004	0.001	0.003	0.010
	Mean IOFs	0.027	0.029	0.026	0.025
Test	t-test	-5.266	-6.034	-5.079	-2.551
		(0.000)***	(0.000)***	(0.000)***	(0.011)**

  

<i>Panel B: Pool data description of financial ratios</i>			
<i>Financial ratio</i>	<i>Mean Co-ops</i>	<i>Mean IOFs</i>	<i>U-test <sup>(2)</sup></i>
Current	1.309	1.309	-1.141 (0.158)
Debt	0.624	0.675	6.520*** (0.000)
Return on assets	0.004	0.027	14.800*** (0.000)

*p-value in parentheses. (\*) significant at 10%. (\*\*) significant at 5%. (\*\*\*) significant at 1%. <sup>(1)</sup> In Panel T-test is built under the assumption of equal variances between groups. Firstly, we apply Levene's test which confirms the null hypothesis of equal variances. Finally, we apply t-test in order to verify if*

the mean of ratios of cooperatives and IOFs is different (Greene, 2008).<sup>(2)</sup> Panel B, the variances are unequal in each financial ratio. Thus, the T-test can be replaced by the Mann-Whitney U test that enables comparison of the two groups without assumption that values are normally distributed. The Mann-Whitney U test to compare the mean of the financial ratios of cooperatives and IOFs (Greene, 2008).

**Table 4. System GMM estimation**

		<i>Current</i>	<i>Debt</i>	<i>Return on assets</i>
<i>Constant</i>		0.1005*** (0.000)	0.0673** (0.043)	0.0319*** (0.000)
<i>Lagged Cooperatives Financial Ratio (1-β)</i>		0.6965** (0.026)	0.8001*** (0.000)	0.1892*** (0.001)
<i>Lagged IOFs Financial Ratio (1-β)</i>		0.5973*** (0.000)	0.6714*** (0.000)	0.1286*** (0.000)
<i>Age<sup>(1)</sup></i>	<i>Infant &amp; Adolescent</i>	- 0.1269*** (0.003)	0.0318* (0.054)	0.0200*** (0.000)
	<i>Middle-aged</i>	- 0.1385*** (0.000)	0.0217** (0.043)	0.0085*** (0.000)
<i>Size<sup>(2)</sup></i>	<i>Micro</i>	-0.0375 (0.154)	0.0082 (0.213)	- 0.0185*** (0.000)
	<i>Small</i>	0.0560** (0.047)	0.0017 (0.757)	-0.0052* (0.069)
<b><i>Post estimation tests</i></b>				
		<i>Current</i>	<i>Debt</i>	<i>Return on assets</i>
<i>Wald Test</i>		160.67*** (0.000)	116.02*** (0.000)	329.76*** (0.000)
<i>Hansen Test</i>		4.890 (0.700)	2.99 (0.725)	10.23 (0.485)
<i>AR(1) test</i>		-9.190*** (0.000)	12.21*** (0.000)	-24.99*** (0.000)
<i>AR(2) test</i>		-1.001 (0.322)	0.020 (0.358)	0.671 (0.503)

Linear restriction about equal coefficients test	4.141** (0.045)	7.184*** (0.000)	0.120 (0.745)
--	--------------------	---------------------	------------------

*p-value in parentheses. (\*) significant at 10% (\*\*) significant at 5% (\*\*\*) significant at 1%.*

*(<sup>1</sup>)The reference category for age is "old". (<sup>2</sup>)The reference category for size is "medium-large enterprise". Notes. System GMM includes year dummies. Instruments for the difference and system GMM equations are discussed in the text. Estimation of GMM is carried out with the xtabond2 Stata 9.0 module by D. Roodman, Center for Global Development, Washington, DC.*

**Table 5. Financial Ratios Adjustment Coefficients ( $\beta$ )**

<i>Ratios</i>	<i>Current</i>	<i>Debt</i>	<i>Return on assets</i>
<i>Cooperatives</i>	0.3035	0.1999	0.8108
<i>IOFs</i>	0.4027	0.3286	0.8714
<i>Significant differences</i>	YES	YES	NO