Determinants of financing decisions and management implications: evidence from Spanish agricultural cooperatives

RESEARCH ARTICLE

Alicia Mateos-Ronco[①a] and Sandra Guzmán-Asunción[b]

[a]Associate Professor, Centre for Research in Business Management (CEGEA), Department of Economics and Social Sciences, Universitat Politècnica de València, Camino de Vera s/n, 46022 Valencia, Spain

[b]Research technician, Cooperatives Agro-alimentàries Comunitat Valenciana, c/Caballeros 26, 46001 Valencia, Spain

Abstract

The unique characteristics of agricultural cooperatives are likely to affect the availability of the funding they can access. This paper analyses the determining factors behind the financing decisions made in these cooperatives, and the management and organisational implications these decisions have for these entities. Financial information obtained from a sample of 106 Spanish agricultural cooperatives was used to calculate the variables that modelled the research hypotheses, which were then introduced into regression models to determine which ones had a significant effect on their financing decisions. According to the economic theory of cooperativism, the results show that these entities come closer to the pecking order theory, i.e. policies that maximise the prices received by members to the detriment of the entity's self-financing abilities, coupled with restrictions on cooperatives' equity capital that may lead them to use debt to fund growth. The results also show positive relationships between cooperatives' indebtedness and other factors, such as investments in non-current assets, liquidity and cooperative size in terms of turnover per member.

①Corresponding author: amateos@cegea.upv.es

1. Introduction

Agricultural cooperatives are the most common business structure used in the farming sector. They emerged to cater for the need to reinforce farmers' bargaining positions in the negotiation process of agri-food markets and reduce their transaction costs (Hendrikse and Veerman, 2001). In many European countries, they have moved up in the food value chain in recent decades as a result of their increased presence, and this has, in turn, led to growth and a stronger international outreach. The fact that the agricultural commodity and food value chains have shifted from domestically oriented, state-controlled systems towards globally integrated food supply chains with private governance has meant new forms of vertical integration for those participating (Swinnen and Maertens, 2007). Agricultural cooperatives facilitate farmers' access to these modern food supply chains (Bijman *et al.*, 2012).

The development of agricultural cooperatives has been encouraged by EU institutions, and has been a clear objective of public policies. In fact, the European Commission (Directorate-General Agriculture and Rural Development) has been studying policies that could help farmers to self-organise in cooperatives as a means of strengthening their market position and generating a solid market income (Bijman *et al.*, 2012). Cooperatives have played an increasingly important role in the EU's food system. Their dynamic development in several European food industry sectors over the last decade has been attributed to the fact that they have managed to obtain a significant share of their own domestic market, as well as to increase control over crucial quality and quantity aspects of their products at different supply chain and product processing levels. Although the success factors that have enabled cooperatives' performance and development differ between sectors and countries, experience shows that clear market orientation, processing and trade operations, innovation and internationalisation, growth, willingness to cooperate, and the relationships between them and their members are all determining factors (Brusselaers *et al.*, 2014; Kalogeras *et al.*, 2009). Their position and strategy are understood as their ability to successfully pinpoint or generate economic benefits for their farmer members in a modern, market-oriented food supply chain (Höhler and Kühl, 2014).

Cooperatives have been defined as a 'user-owned and controlled business from which benefits are derived and distributed on the basis of use' (Dunn, 1988). The unique characteristics bestowed on these organisations by the application of these cooperative principles centre on their variable share capital (based on the principle of open membership), on the particularities of their mandatory reserve funds and how they are endowed, on how their profits are put together and shared out (profits are realised by returning net income (or surplus) to patrons in proportion to their use of the cooperative, by receiving/paying fair prices to them, and by gaining access to markets, supplies, and services), in paying up subscriptions to share capital, and in the unique business and financial relationships they have with their members. The weaknesses of the cooperative model have traditionally included inefficient decision-making processes (democratic decision-making often becomes problematic: one-member-one-vote or proportional voting) and their capital constraints. These constraints occur because agricultural cooperatives have traditionally adhered to a system of exclusive member ownership in the form of direct investments, retained patronage refunds and per-unit capital retains (Kalogeras *et al.*, 2013).

From a financial viewpoint, the particularities inherent to cooperative share capital and reserve funds create three problems: firstly, the difficulties in accumulating share capital given members' rights to have their share capital returned to them should they leave the cooperative. In practice, this means that the only way to accumulate capital is a continuous increase in the reserve fund or an increase in the cooperatives' social base. The second factor is related to the traditional difficulties these organisations have in accessing capital markets, given that, despite the fact that only its access to the equity market is regulated (and vetoed), cooperatives are not a competitive financial tool for third-party acquisitions, implying that funding their equity depends on their members and on the organisation's ability to generate funds via reserves. Finally, cooperatives have one of the strictest legal company regulations in terms of self-funding (mandatory reserve fund endowments, which are also undistributable), as a consequence of the variable nature of their share capital, and to prevent possible loss of the guarantees provided to third parties.

Accordingly, agricultural cooperatives' organisational characteristics, decision-making processes, ownership structures and substantive features can have an effect on financing decisions. Their distinctive characteristics are likely to affect the availability of funding, as well as their financing preferences. For these reasons and many more, there is little reason to think that the fundamental determinants of capital structure in investor-owned firms (IOF), as documented by previous research, hold true for agricultural cooperatives. Traditionally, empirical studies into financing decisions have not focused on these entities, but have instead centred on large investor-owned firms. This study contributes to the literature by explicitly acknowledging that financing decisions are context-specific, depending on a firm's characteristics, and that decisions concerning the level and composition of debt are made simultaneously (Huyghebaert and Van de Gucht, 2007).

The analysis of capital structures is a highly relevant aspect in corporate finance. Despite a swift increase in the number of published works in recent decades, research has still not been able to put forward a universal financing structure theory (Harris and Raviv, 1991; Jensen, 1986; Myers, 2001); or a theory about those factors that influence it. Indeed, there are only partial theories based on empirical works that attempt to relate this structure to different types of variables. In addition, no conclusive results been drawn to unequivocally support or reject any of them (Hol and Van der Wijst, 2008). This has led to a consensus in the scientific literature on the uniqueness of financing decisions and the variables conditioning them, which are determined by the characteristics of the organisation, its development, and the context in which it operates. In micro-economic terms, the repercussions of different types of funding can vary according to the economic environment (Levy and Hennessy, 2007) or company type (Wald, 1999).

The need to address empirical studies on the factors that determine agricultural cooperatives' financing decisions is also justified by their important economic contributions. In 2013, there were 3,838 agricultural cooperatives (first- and second-tier) in Spain whose total turnover was €26.183 billion. They provided 96,220 jobs and had almost 1.2 million members. This represents 59% of Final Agricultural Output, 29% of Gross Output and 21% of employment in the Spanish food industry (Cooperativas Agro-alimentarias de España, 2014). Although the situation of agricultural cooperativism in Europe varies from one country to another, it still accounts for an average market share of 40% in the EU, and in some cases, exceeds 50% (Scandinavia, Ireland, the Netherlands, France and Austria). In Spain, the figure lies between 40 and 50% depending on the sector, and is similar to Belgium and Germany. The market share of Spanish cooperatives in the fruit and vegetable sector is 50%, which is higher than that reported for France, Finland or Ireland, yet is well below the percentages for the Netherlands (95%) and Belgium (85%) (Bijman *et al.*, 2012).

The aim of this study is to examine the capital structure of Spanish agricultural cooperatives, and to pinpoint the factors (or variables) that determine their level of debt. In addition, a study of the explanatory factors (variables) identified has enabled us to verify whether the capital structure of agricultural cooperatives, in the context of the specific features of this type of organisation, resemble any of the current financial theories. Accordingly, this paper follows previous lines of research (Cole, 2013; Frank and Goyal, 2009) that point to just how difficult it is to test which financial theory best explains the firm capital structure. This is why empirical studies normally centre on determining which factors can most reliably explain it.

There are many different types of agricultural cooperatives. On the basis of a literature review of the classifications and types of farmer-owned cooperatives (Bijman *et al.*, 2012), we mainly selected cooperatives that handle fruit and vegetables, perform functions such as processing and marketing products, are primary or first-tier cooperatives, and are also traditional cooperatives from the financial/ownership structure perspective. The financial information from a sample of 106 Spanish agricultural cooperatives was used to calculate the economic variables, which were then introduced into regression analyses to determine which ones had a significant effect on their financial structure. Book-value firm leverage was measured by the ratio of total debt to total assets and the ratio of long-term debt to the global financing structure.

To the best of the authors' knowledge, no previous studies have empirically analysed the application of the main financial theories of capital structure in agricultural cooperatives, and it is, therefore, an underexplored

subject. This is the significant contribution of this manuscript. In addition, this paper contributes to the current literature on finance and agricultural economics in different ways. First, it complements previous research on the relevant factors that explain debt levels in IOFs. The paper sets out the factors that explain agricultural cooperative indebtedness. Thus, an analysis of the implications of capital structure theories in non-IOF organisations will not only bring additional evidence but will also broaden the vision of financial decisions in types of businesses operating in different financial environments. Secondly, comparing the results against research carried out with non-cooperative organisations adds empirical evidence on how the features and substantive characteristics of cooperatives determine their financial decisions, thus contributing to the literature on the economic theory of cooperativism. Finally, it provides evidence about which capital structure theory or theories most reliably explain the capital structure of Spanish agricultural cooperatives.

The remainder of this paper is structured as follows: the next section presents the conceptual research framework. The third section presents the sample selection criteria used and the definition of the variables utilised in the analytical methods. The fourth section details the results of the descriptive analysis of the sample and the proposed regression models. The fifth section discusses the results, while the last section sets out the conclusions drawn from the research.

2. Theoretical framework and hypotheses

In their pioneering work on capital structure, Modigliani and Miller (1958) concluded that, according to the perfect financial market assumption, a company's market value does not depend on its capital structure. Yet in practice, managing directors must decide what the most suitable capital structure is so that their organisations can maximise their market value. Despite decades of empirical works, no universal theory on the subject has yet been formulated, and there are no reasons to expect one. This section describes the main financial theories that affect a firm's financing decisions. These theories are applied to agricultural cooperatives, as are the predictions about how these theories are reflected in observable indebtedness factors, i.e. the variables used to verify the corresponding hypotheses and other control variables.

It might seem surprising to apply the theories built for IOFs, based on the presumption that the firm's owner wants to maximise the wealth of the firm, to cooperatives, whose basic principles (user-owner principle, user-control principle and user-benefits principle) determine that the cooperative's sole purpose is to provide and distribute benefits to its users, on the basis of their use (Dunn, 1988). Benefits in cooperatives are realised by returning net income (or surplus) to patrons in proportion to use, by receiving/paying fair prices, and by gaining access to markets, supplies and services. Obviously, however, it would be not possible to provide these benefits for members if the cooperative, as a business, did not reach adequate levels of business efficacy and efficiency, thus generating the profits that members share.

Testing compliance with the main capital structure theories in cooperatives is based on the concept of the cooperative as a company. The differences between a cooperative and an IOF (their running is guided by cooperative principles) means that the objectives of economic efficiency and efficacy, which are common to all organisations, are framed, in the case of cooperatives, in the organisation's special relationship with its members, maintaining member commitment to the entity, and its specific organisational and governance features (democratic governance). Whether the different financial theories fit in or adapt to the cooperative theory is precisely the subject under study here.

2.1 Trade-off theory

The trade-off theory suggests that debt generates certain positive effects for a company, consisting of balancing the benefits of using debt against the costs of financial distress that rise at an increasing rate with the use of leverage. One of these effects is the tax advantages that using external funding can represent, given that interest payments are tax-deductible business expenses. Reducing tax revenue by paying debt-related interest can act as an incentive to using debt as a source of funding. This theory predicts an 'optimal' ratio of debt

to equity in which the tax benefits of deductible interest are just offset by the costs of financial distress. Yet companies can also resort to other tax advantages instead of paying financial interest (depreciation, deductions for creating jobs, deductions through Research & Development & Innovation.). Firms with large non-debt tax shields have an incentive to take on less debt (Deangelo and Masulis, 1980).

The possibility of Spanish agricultural cooperatives validating the trade-off theory would initially seem unlikely, for several reasons. First, Spanish cooperatives benefit from a substantive tax system (Law 20/1990, of 19 December, on the cooperative tax system, and its successive amendments (BOE, 1990)) which gives them the status of protected entities, or specially protected entities, from a tax perspective. This justifies the fact that these entities do not consider debt as a form of tax shield, as they already have a series of tax incentives specifically tailored to their type of organisation. Secondly, the 'optimal' ratio of debt to equity set out in the trade-off theory is conditioned in the case of cooperatives, by (variable) share capital restrictions and the difficulty in accumulating profits, as these organisations prioritise the distribution of profits among their members (generally via the prices they pay them). Finally, the conditions required to access external funding depend on the special relations that exist between the different stakeholders, which generate agency problems and asymmetrical information, as we will see later.

Notwithstanding the above, to empirically test this hypothesis, the depreciation expenses/total expenses ratio was used as the independent variable by considering that it acts as a tax shield in contrast to debt-associated interests (Hol and Van der Wijst, 2008). The initial hypothesis is that as non-debt tax shields offer companies an incentive to take on less debt, a negative relationship exists between the variables used to test this: depreciation expenses and amount of total debt (Sogorb, 2005). Therefore, we put forward our first hypothesis (H_1):

H_1: Agricultural cooperatives' use of non-debt tax shields reduces total debt levels.

2.2 Pecking order theory

A firm's capacity to generate resources through its main activity (internal funding or self-funding) is also considered to be a defining factor of its financing structure, according to the pecking order theory. This theory relies upon the concept of asymmetric information between managers and investors that guides managers in their preferences for raising funds. According to this theory, firms opt for funding from sources with the lowest degrees of asymmetric information because the cost of borrowing rises with this metric (Cole, 2013). This takes the company to a 'pecking order' in its search for funds. Firms finance new investment projects by resorting to debt only when internal resources are insufficient (Graham and Harvey, 2001; Murray and Goyal, 2003; Myers, 2001; Rajan and Zingales, 1995). Firms prefer internally generated funds (retained earnings) to external ones, and private debt (loans from financial institutions) to equity from outside sources if external financing is used. Accordingly, there is no 'optimum' ratio of debt to equity under the Pecking Order Theory. Instead, the financial structure is simply the result of the decisions made previously to obtain capital.

Extrapolating this theory to agricultural cooperatives requires two major clarifications. On one hand, the details of this theory differ considerably from what occurs in large IOFs because traditionally cooperatives have not had access to outside equity. Therefore, when this option disappears from the pecking order theory, decisions are reduced to a choice between inside equity from owners (members) or private debt, basically, in the shape of bank loans. If there are no internal resources (retained earnings) in the cooperative, or these are not sufficient, then debt will be used. On the other hand, agency problems and asymmetric information in cooperatives arise out of the special relationships that exist between their stakeholders. In fact, one of the substantive features of these organisations is the unique relationship they have with their members who, in turn, are owners, users (buyers and sellers), controllers and beneficiaries, meaning that they may pursue very different goals. In addition, in the majority of cooperatives, members usually delegate day-to-day decisions to managers, probably to avoid the costs of collective decision-making (Arcas-Lario *et al.*, 2014). As a result, the different stakeholders (members, Board of Directors and professional managers), may have varying

objectives for the management of the cooperative, generating agency conflicts and agency costs (Jensen and Meckling, 1976). In the framework of the agency theory, agency problems in cooperatives arise when, in addition to conflicting objectives between stakeholders, there is also information asymmetry between them. The agent in this theory (board members and managers) has more information than the principal (members) about the environment or conditions in which decisions are made. Corporate governance in cooperatives examines the mechanisms that the entity can employ to avoid agency problems, by reducing the information gap and providing the appropriate control mechanisms.

The analysis of the effect of the internal financing generated by the cooperative was modelled by an independent variable, defined as the ratio of the sum of reserves (retained profits), plus depreciation charges (expenses separated from results which do not entail resources leaving the company), to total assets. In short, the ability to generate internal funding is modelled through the relative weight of the economic cash flow (resources generated) in relation to total assets. Accordingly, the second research hypothesis put forward is (H_2):

H_2: Agricultural cooperatives' capacity to generate internal financing is negatively related to its total debt level.

2.3 Financial theory predictions for cooperatives

The two financial theories set out above reveal specific verifiable hypotheses that often lead to contradictory empirical predictions (Frank and Goyal, 2009). The predictions for each theory are set out below in relation to different factors which have been established as being relevant in explaining the financial structure in IOFs, and their applicability and expected influence in agricultural cooperatives.

■ *Asset composition*

From a financial point of view, asset characteristics have a twofold impact on a firm's financing policy: on the one hand, tangible assets raise the possibility of obtaining finance by offering real or tangible guarantees, and to such an extent that they can be the object of immediate valuation. In addition, tangible assets suffer smaller percentage losses in liquidation (Cole, 2013). Accordingly, the trade-off theory predicts a positive relationship between indebtedness and the materiality of assets.

Along the same lines, the problem of asymmetric information tends to diminish when the proportion of tangible assets in the firm is high, as these can be immediately valued. This is why it is easier for a company with a large number of tangible assets to borrow from banks and other sources of credit. Similarly, the pecking order theory also predicts a positive relationship between indebtedness and tangible assets.

It has been pointed out that agricultural cooperatives face organisational problems when farmers have to take investment decisions in the cooperative that require sizeable funds (Hendrikse and Veerman, 2001). The reason is that farmers have to decide about investments in two production stages: on the farm (the upstream stage), and at the processing level in the cooperative (the downstream stage). From this perspective, a cooperative is not an efficient organisational form because the optimal investment decision on bringing produce to value in the downstream stage is not taken by a cooperative because it is farmers that make the investment decisions, bringing farm output and cooperative output jointly to a maximum value. From a transaction-cost perspective, the governance structure of a cooperative implies that input suppliers have the formal authority over investment decisions, whereas outside equity holders have this right in an investor-owned firm.

However, this particularity does not invalidate the predictions of the aforementioned theories in terms of the composition of assets and their relationship with debt levels. As a result, the following hypothesis is proposed (H_3):

H_3: A larger volume of long-term assets is an incentive to use debt as a financing source.

Here, the cooperatives' non-current (long-term) assets to total asset ratio is used as the independent variable. This hypothesis is based on the assumption that the investments of agricultural cooperatives are not specific because they operate in markets with undifferentiated products. Thus, cooperatives are not appealing to external investment funds. In addition, any appeal they did have would diminish given that democratic-decision making in an organisation is problematic. From a financial governance perspective, the terms on which funds are made available by outsiders are worse than those faced by an IOF (Hendrikse and Veerman, 2001).

It is also necessary to compare the relationship between a firm's liquidity and the composition of its financing structure. Liquid assets can easily be converted into cash, which means that expected insolvency costs will be lower in cooperatives with more liquidity. The trade-off theory predicts a positive relationship between leverage and liquidity. It is also reasonable to believe that striking a balance between the expiry date of a debt and asset composition would reduce insolvency risks and would adapt the financing structure to that of the asset. Firms in general, including cooperatives, take a potential liquidity risk when they finance non-current assets with short-term debt.

However, the pecking order theory predicts an ambiguous relationship between leverage and liquidity. On one hand, profitable organisations are more likely to have more liquid assets yet, in turn, they will tend to use debt to preserve their level of liquidity in order to take advantage of any possible investment opportunities that may arise. This would predict a positive relationship but, if liquidity is dependent on profitability and the latter (as will be seen later) is difficult to measure in cooperatives, then the pecking order theory would predict a negative relationship between liquidity and leverage.

To test this relationship, the following hypothesis has been formulated (H_4):

H_4: There is a positive relationship between debt and liquidity in agricultural cooperatives.

The liquidity ratio (current assets/current liabilities) and the quick ratio (cash/current liabilities) were proposed as the independent variables. The latter is used because the main liquid asset in cooperatives is cash. Thus, this isolates the possible distorting effect that a cooperative's accumulation of stock can have on liquidity.

■ *Cooperative size*

Firm size has been a recurrent variable in empirical studies on corporate capital structure, even though its real implications are neither unequivocal nor have been conclusively demonstrated. Most works have suggested a positive relationship between company size and debt, which seems justified given the possibility that large-sized companies have to achieve economies of scale through long-term debt, providing them with higher rates of profitability and turnover so they can access capital markets more easily (Frank and Goyal, 2009). Large firms face a smaller default risk and lower debt-related agency costs. Thus, the trade-off theory predicts a direct positive relationship between company size and level of debt. Size could also improve the asymmetric information problems of external investors and reduce issuance costs, which would increase the company's preferences for issuing share capital against debt (Rajan and Zingales, 1995). This is why the pecking order theory predicts an ambiguous relationship (Cole, 2013).

The predictions of the trade-off theory in terms of company size dovetail perfectly with the cooperative business model: larger organisations have a lower risk of insolvency, have greater profits and turnover, and as a result, better conditions when accessing external funding. However, agency problems and asymmetric information normally increase with the size of the cooperative. Firstly, because larger cooperatives normally employ managers and other salaried staff to implement the decisions of members and these may pursue different objectives to those of their members. Secondly, because democratic management mechanisms usually become more complex in larger cooperatives.

The most recurrent variable used to evaluate the possible impact of size is the book value of the entity's total assets, which is affected by logarithmic transformation (Arcas *et al.*, 2011). Two other variables which reliably reflect the size of an agricultural cooperative have been included: number of members, and the turnover to the total number of cooperative members' ratio. Here, the hypothesis put forward is (H_5):

  H_5: There is a (positive or negative) relationship between cooperative size and debt.

■ *Firm performance*

Empirical research has indicated positive and negative relationships between debt and firm performance, to such an extent that efficiency markedly determines the risk of a firm facing financial distress. The trade-off theory predicts a positive relationship and postulates that the more profitable the company is, the less likely it is to default on its liabilities, and the more taxes it can avoid by increasing its indebtedness. However, the pecking order theory predicts a negative relationship, that is, the more profitable the company, the better its self-financing capacity and, consequently, less debt will be needed. In IOFs, the performance measure most broadly used in research has been return on assets.

Evaluating the performance of cooperatives has been a classic aspect of study in the agricultural economy (Heyder *et al.*, 2011; Lerman and Parliament, 1991) given the special characterisation that this concept presents in these entities' substantivity. Cooperatives are a type of business with many peculiarities, which stem from their own different legal regulations and also from the ideological framework of cooperative principles. Compared to IOFs, the objective of cooperatives is to maximise benefits for members by providing them with a series of services that can satisfy their 'needs', the purpose of which goes beyond optimising the profitability of their contributions (Karami and Rezaei-Moghaddam, 2005). Members are not only owners who participate in decision-making and provide funds, but are also suppliers of the products that cooperatives offer the market (Arcas-Lario *et al.*, 2014). This implies that the efficiency and efficacy objectives shared by any company must depend, in the case of cooperatives, on maintaining the members' commitment to the entity. This should be achieved through adequate business management, which generates the profits that are shared out to members. Farmers may be committed to their cooperatives if these adapt to and fulfil their conditions, thereby providing member influence and social relationships (Liang *et al.*, 2015a). However, farmers will also be interested in seeing whether their cooperative is well adapted to buyers' markets, as this provides an opportunity to create a profitable business which will benefit their interests (Cechin *et al.*, 2013).

Measuring cooperative performance must necessarily involve assessing the degree to which they meet objectives at two levels: business (economic performance) and social (catering for members' requirements and meeting their expectations). Yet this issue has still not been resolved, and opinions on it differ. Research, in its attempt to evaluate cooperative performance from this twin perspective, has employed very different indicators (Arcas-Lario *et al.*, 2014; Bijman *et al.*, 2012; Challita *et al.*, 2014; Kalogeras *et al.*, 2013; Soboh *et al.* 2009). At present, member satisfaction with its cooperative is increasingly being used by researchers to measure the success or performance of these organisations (Arcas-Lario *et al.*, 2014; Hansen *et al.*, 2002). Other authors, however, argue that given the difficulty of assessing the social perspective of cooperative activity, only performance measures based on accounting information can be applied to cooperatives (Heyder *et al.*, 2011). Yet interpreting economic ratios in agricultural cooperatives is complex because of the settlement-to-members policy, which follows the 'gross margins' criterion that many cooperatives adopt, as opposed to the 'market price' criterion that leads them to 'zero surplus', and also to distribute profits to members via prices (Kyriakopoulos *et al.*, 2004).

The use of two types of independent variables is proposed: first, the cooperative must be acknowledged as a type of company, and as such, it must achieve certain objectives that relate to the economic activity it performs. Accordingly, the total asset turnover ratio was used as a performance measure at business level, based on previous studies conducted in fruit and vegetable cooperatives (Lajara-Camilleri and Mateos-

Ronco, 2012) and European milk cooperatives (Soboh *et al.*, 2010) which successfully used this variable as a performance measure.

Second, it is also necessary to evaluate the degree to which cooperatives' social objectives are fulfilled (social performance) in terms of members' expectations. This normally entails maximising the prices (settlements) received from cooperatives. The individual review of cooperative income statements in our study sample allowed us to obtain information about these settlements. Accordingly, the 'settlement per member' independent variable was calculated for each entity, defined as the ratio between purchases from members as a percentage of the number of members. The following hypothesis was formulated (H_6):

H_6: There is a (positive or negative) relationship between cooperative performance and its debt level.

3. Methodology

3.1 Sample

The development of cooperativism in EU Member States has followed the same needs and objectives, but the ways in which it has evolved and met the challenges posed by the current market have been very different in northern European countries and Mediterranean ones. The northern European agricultural cooperative model seems much more market-oriented, is highly flexible and has a clear strategy based on dimension (through mergers and acquisitions) and internationalisation. In contrast, the Mediterranean countries model (which includes the Spanish case) still focuses on production, is made up of small (and sometimes very small) entities, and lacks market orientation and international activity (Trenzado, 2013). The present study focuses on Spanish cooperatives as they are representative of the 'Mediterranean model'. The target study population comprises all the cooperatives that perform agricultural activities in Spain. As previously stated, the total population of these cooperatives in Spain is 3,844 (2012). Of these, 2,708 are associated with Cooperativas Agro-alimentarias de España, an entity that represents Spanish agricultural cooperativism in the EU's General Committee for Agricultural Cooperation (COGECA).

As direct access to information was necessary for the paper's working objectives, a representative sample of agricultural cooperatives was taken from Cooperativas Agro-alimentarias de España members because, as a whole, these organisations were considered to present sufficient variability in terms of their characterisation. The procedure used to select the sample (simple random sampling) guaranteed its representativeness. Access was obtained to the financial statements of 187 cooperatives for the year 2012. They were manually purged to eliminate those that had inconsistent or incomplete data, or did not separate the heading 'Procurement from members' item in 'Costs of goods sold' on the income statement, since this information was essential for the study objectives. Hence, the final study sample was made up of 106 agricultural cooperatives which included data about all the selected variables, and this fact helped to avoid having to deal with the missing values problem (Frank and Goyal, 2009). According to the sample value estimate (for a 95% confidence level and a maximum allowed error of 10%), the minimum representative value was 94 entities.

Table 1 summarises the distribution of the cooperatives in the population and in the sample by sub-sectors of activity, giving the relative importance of each group in the sample. In Spain, the main sectors in which agricultural cooperatives operate, in terms of turnover and number of organisations, are the fruit and vegetable sector (27% in terms of turnover), and the olive oil and supplies sectors (12.4 and 11.3%, respectively). As a result, the inclusion in the sample of cooperatives belonging mainly to the fruit and vegetable sector, and to a lesser extent to the olive oil and supplies sectors, dovetails with the population distribution. Thus, the selected sample was representative of the population and may be considered an appropriate universe for the testing of the hypotheses presented above.

Table 1. Distribution of the population and of the sample of agricultural cooperatives.

Subsector	Population[1] % (turnover)	Sample % (number of coops.)
Fruit and vegetables	26.9	41.5
Olive oil	12.4	24.4
Supplies	11.3	17.1
Animal feed	10.7	2.4
Arable crops	7.7	0.0
Wine	7.5	2.4
Dairy	6.6	0.0
Other	16.9	12.2
Total	100	100

[1] Adapted from Cooperativas Agro-alimentarias España (2014).

3.2 Variables description

Multiple linear regression was used to study the factors that affect agricultural cooperatives' financing decisions. For this regression and after consulting the literature, a series of independent variables was selected which could theoretically affect the financing decisions of these entities. The dependent variable used was total debt ratio (DEBT), defined as the total debt to total assets ratio.

We considered it necessary to evaluate the effect of existing debt on the cooperative's financing structure. Traditionally, total debt ratios tend to be resorted to when a firm's borrowing is evaluated according to its book value. The entity's total debts also include current liabilities that are considered essential for daily production, are spontaneously generated and, as a result, remain beyond the financing decisions made by the entities' managing directors. For the purposes of this study, they had to be separated from the bank loans and other financial products that financing intermediaries normally offer; that is, other negotiated debts that derive directly from the financing strategy adopted by the cooperative. We resorted to an approximate definition of negotiated total financing by the long-term debt ratio (LT-DEBT), which links long-term debt to the total financing structure (total liabilities and shareholders' equity). This ratio was also used as a dependent variable in the second regression model. It was assumed that most negotiated financing corresponded to the long-term debts that the cooperative could have (non-current liabilities), whereas short-term debt (current liabilities) mainly constituted the spontaneous financing of production activity. This is why the 'short-term debt' variable was not used in the other regression model, given that the majority of short-term debt in agricultural cooperatives are not negotiated debt, and the current bank borrowings usually reflected in their balance sheets normally correspond to the accounting reclassification of non-current loans which appear in their non-current liabilities. This fact is consistent with previous research (Abad *et al.*, 2017) that shows that the organisations with the greatest asymmetrical information issues (and in agricultural cooperatives these issues exist, as discussed above) tend to use current liabilities more and that when facing difficulties in borrowing from banks, usually resort to trade credit as a source of short-term funding. To this, we need to add the correlation between the dependent variables, with the variable total debt ratio (DEBT) totalling the sum of long-term debt (LT-DEBT) and short-term debt.

Table 2 summarises the independent variables used, along with their definition and the sign that their relationship with the dependent variables would be expected to take. Univariate and multivariate techniques were used to find evidence for the factors that determine agricultural cooperatives' financing structure. First, the descriptive statistics of the variables, which modelled the different research hypotheses, were calculated and analysed. Then, the linear regression models were estimated. The analyses were performed with SPSS Statistics 21.0 (IBM Corporation, Armonk, NY, USA).

Table 2. Definition of independent variables.

Research hypothesis	Independent variables	Definition of variables[1]	Code	Expected sign[2]
H_1	Depreciation	(Depreciation expenses/total expenses)	DEPR	(-)
H_2	Self-financing	((Reserves+depreciation)/TA)	SELF	(-)
H_3	Asset composition	(NCA/TA)	ACOM	(+)
H_4	Liquidity ratio	(CA/CL)	LIQ1	(+)
	Quick ratio (acid test)	(Cash/CL)	LIQ2	(+)
H_5	Total assets logarithm	Log. (TA)	LOGA	(?)
	Number of members	No. members	MEMB	(?)
	Turnover per member	(Annual turnover/no. members)	TURN	(?)
H_6	Total assets turnover	(Annual turnover/TA)	TATU	(?)
	Settlement per member	(Purchases from members/no. members)	SETT	(?)

[1] TA = Total assets; NCA = non-current asset; CA = current asset; CL = current liability.

[2] Expected sign: (+) positive relationship; (-) negative relationship; (?) ambiguous relationship.

4. Results

4.1 Sample characterisation

Table 3 includes the descriptive statistical values of the variables used to previously perform sample characterisation. Certain magnitudes were also included, which were not subsequent multivariate analysis variables, but provided further interesting information about sample characterisation (total assets and turnover). As the data indicated, the sample was quite heterogeneous, with broad ranges found in most indicators and high standard deviations. Thus, the use of the median was recommended, though this presented marked differences with mean values in some cases.

According to the mean values of the indicators on cooperative size (total assets and turnover), on average the agricultural cooperatives in our sample correspond to the *small enterprises* category (Recommendation Criteria of The European Commission, of 6 May 2003, on defining micro-enterprises, small- and medium-sized

Table 3. Descriptive statistics for variables (N=106).

Variables	Min.	Max.	Mean	Standard deviation	Median
DEPR	0.0024	0.3542	0.0424	0.0399	0.0347
SELF	0.0476	0.9164	0.4197	0.2333	0.3984
ACOM	0.0616	0.9756	0.5050	0.2027	0.5086
LIQ1	0.2474	33.5556	2.8491	4.1675	1.4506
LIQ2	0.0000	0.5134	0.1200	0.1102	0.0972
LOGA	2.5977	4.6739	3.6698	0.4567	3.6540
MEMB	74	100,000	1,721.21	9,673.9910	510
TURN (1000€/member)	0.1720	236.4105	14.9214	30.8401	6.1459
TATU	0.0885	7.8183	0.9876	0.9207	0.8793
SETT (1000€/member)	0.0348	41.2238	4.6531	6.7378	2.1403
DEBT	0.0586	0.8819	0.4846	0.2398	0.5178
LT-DEBT	0.0008	0.5349	0.1483	0.1355	0.1106
Total assets (1000€)	396	47,191	8,036.66	9,418.1430	4,508.50
Turnover (1000€)	214	222,009	9,904.09	24,784.4390	2,807

enterprises). This classification was also corroborated when median values were used. This finding coincides with the current reality of the Spanish agricultural cooperative sector, which is generally characterised by small-sized enterprises. The turnover of 73% of the agricultural cooperatives in Spain was under €5 million in 2013 (Cooperativas Agro-alimentarias de España, 2014).

When we compared the size and activity data of the cooperatives in our sample with mean agricultural cooperativism data in Spain, we saw that, according to the median values, they were better positioned in terms of the entities' social bases: 307 members per national cooperative as opposed to 510 cooperative members in our sample. However, the mean turnover figure of €2.8 million per entity in the study sample differed substantially from the €6.7 million per entity in the national mean figure. This small size sharply affected the turnover value per member variable which, in our sample, barely exceeded €6,000, stood at around €22,000 in Spain, and reached around €97,000 per member for the top ten national cooperatives.

The entities included in our sample presented a generally balanced financing structure, with total debt ratios ranging between 6 and 88%, but with mean and median values of around 50%. It is worth stressing the slight relative importance attached to long-term debt in the financing structure, which barely reached 15% for median values whilst maximum values only slightly exceeded 50%. This fact is justified by considering the time horizon that the data corresponded to (the year 2012), and is quite feasible given that the financial troubles and difficulties that the Spanish economy has faced in recent years have increased the financial conservatism of these entities, plus their aversion to risk. Therefore, they tend to opt for current financing linked to their production activities, to the detriment of long-term liabilities negotiated with financial institutions.

This balanced financing structure also corresponds to their economic structure, in line with their long-term investments, which have a relative mean weight of 50%, and similar mean and median values. The entities in our sample also appeared to have suitable liquidity (LIQ1) because, although the mean values apparently suggested surplus current assets compared to short-term liabilities, they were influenced by extreme values which were nonetheless eliminated in the median. It should be stressed that the liquidity ratio considers that all current asset items are liquid assets, including stocks and receivable accounts. These assets present a variable degree of conversion into cash, which can compromise the entity's real liquidity. In fact, on average, the quick ratio (LIQ2) revealed a low cash volume for short-term liabilities (around 10%). This conditions these entities' real liquidity and their ability to convert cash from their current assets.

4.2 Determinant factors of agricultural cooperatives' financing structure

The proposed regression models respond to these expressions:

$$DEBT = b_0 + b_1 \, DEPR + b_2 \, SELF + b_3 \, ACOM + b_4 \, LIQ1 + b_5 \, LIQ2 + b_6 \, LOGA + b_7 \, MEMB + b_8 \, TURN + b_9 \, TATU + b_{10} \, SETT + e \tag{1}$$

$$LT\text{-}DEBT = b_0 + b_1 \, DEPR + b_2 \, SELF + b_3 \, ACOM + b_4 \, LIQ1 + b_5 \, LIQ2 + b_6 \, LOGA + b_7 \, MEMB + b_8 \, TURN + b_9 \, TATU + b_{10} \, SETT + e \tag{2}$$

Tables 4 and 5 present the results of the regression analyses estimated by the ordinary least squared regressions performed on the cooperative sample with the total debt ratio (model 1) and the long-term debt ratio (model 2), respectively, as the dependent variables.

Given the joint significance of the parameters, the hypothesis that all the regression coefficients in model 1 (Table 4) were equal to zero was rejected (F=51.378, P<0.000). The standardised coefficients revealed that one standard deviation change in the amount of the self-financing (SELF), liquidity ratio (LIQ1), total assets logarithm (LOGA), asset composition (ACOM), turnover per member (TURN) and total asset turnover (TATU) variables, respectively, resulted in standard deviation changes of -0.693, -0.340, -0.124, -0.111, 0.238 and -0.105 in the total debt (DEBT), when assuming that the other variables remained constant. The

Table 4. Regression coefficients for the model of the determinants of cooperatives' total debt (DEBT).

	Unstandardised coefficients	Standard error	Standardised coefficients	*t*-value	*P* (*t*-value)	Condition index
(constant)	1.143	0.097		11.727	0.000	1.000
DEPR	0.353	0.262	0.059	1.345	0.182	2.174
SELF	-0.712	0.052	-0.693	-13.751	0.000	2.442
ACOM	-0.132	0.059	-0.111	-2.234	0.028	3.328
LIQ1	-0.020	0.003	-0.340	-7.328	0.000	3.565
LIQ2	0.067	0.100	0.031	0.666	0.507	3.799
LOGA	-0.065	0.025	-0.124	-2.600	0.011	5.117
TATU	-0.027	0.013	-0.105	-2.161	0.033	6.581
SETT	-0.005	0.002	-0.134	-1.910	0.059	7.925
TURN	0.002	0.001	0.238	3.283	0.001	10.465
MEMB	5.898E-007	0.000	0.024	0.517	0.606	34.620

R^2=0.844

Adjusted R^2=0.828

Stein R^2=0.807

F=51.378 (*P*<0.000)

Dependent variable: DEBT (model 1)

Kolmogorov-Smirnov normality test (Lilliefors significance correction): *F*=0.052 (*P*=0.200)

Shapiro-Wilk normality test: *F*=0.985 (*P*=0.261)

Table 5. Regression coefficients for the model of the determinants of cooperatives' negotiated debt (LT-DEBT).

	Unstandardised coefficients	Standard error	Standardised coefficients	*t*-value	*P* (*t*-value)	Condition index
(constant)	0.255	0.097		2.631	0.010	1.000
DEPR	1.134	0.261	0.334	4.340	0.000	2.174
SELF	-0.186	0.052	-0.321	-3.615	0.000	2.442
ACOM	0.306	0.059	0.458	5.218	0.000	3.328
LIQ1	-0.004	0.003	-0.136	-1.663	0.100	3.565
LOGA	-0.069	0.025	-0.234	-2.774	0.007	3.799
TURN	0.001	0.001	0.157	1.228	0.222	5.117
TATU	0.030	0.013	0.206	2.407	0.018	6.581
LIQ2	-0.003	0.099	-0.003	-0.035	0.972	7.925
MEMB	0.000	0.000	-0.053	-0.653	0.515	10.465
SETT	-0.001	0.002	-0.033	-0.268	0.789	34.620

R^2=0.515

Adjusted R^2=0.464

Stein R^2=0.401

F=10.098 (*P*<0.000)

Dependent variable: LT-DEBT (model 2)

Kolmogorov-Smirnov normality test (Lilliefors significance correction): *F*=0.084 (*P*=0.062)

Shapiro-Wilk normality test: *F*=0.973 (*P*=0.030)

t-values of these variables were significantly different from zero at the 0.05 level. The negative sign of most coefficients indicates that any increase in these variables would result in a decrease in cooperatives' total debt, while any increase in turnover per member would end up increasing its total debt.

We also tested the joint significance of the parameters in model 2 (Table 5) (*F*=10.098, *P*<0.000). The *t*-values of the depreciation (DEPR), self-financing (SELF), asset composition (ACOM), total assets logarithm (LOGA), and total assets turnover (TATU) variables were significantly different from zero. The signs of the coefficients revealed positive relationships between long-term debt and depreciation, asset composition and total assets turnover, and negative relationships between the dependent variable and the self-financing and total assets logarithm variables.

4.3 Validating regression models

Regression model 1 presented high explanatory power, as revealed by both the determination coefficient (R^2=0.84) and the adjusted determination coefficient (adjusted R^2=0.83). The proximity of both values revealed the goodness of fit achieved. Moreover, R^2 was calculated according to the formula proposed by Stein (Stevens, 1992), which evaluates the predictive power of the estimated model, when taken from a completely different sample of the same population. The obtained value (0.81) was similar to the non-adjusted R^2 (0.84), which implies a model with high predictive validity. Nevertheless, model 2's explanatory power was notably worse, and larger differences were detected among the determination coefficient values (R^2=0.51), the adjusted determination coefficient (adjusted R^2=0.46) and the calculated Stein coefficient (0.40).

Detecting and processing outliers are one of the main problems faced by empirical researchers who use cross-sectional data of corporate capital structure (Frank and Goyal, 2009). As opposed to their more generalised, preventive processing, that of 'winsorising' the variables to some percentiles (Cole, 2013; Huyghebaert and Van de Gucht, 2007), in this case, Mahalanobis distance was used to detect the multivariant outlier cases in the sample. Using a very conservative threshold (*P*<0.001*) in the statistical significance tests (Hair *et al.*, 1995), six significantly different observations were identified in both models. Nonetheless, after performing individualised analyses of these cases and checking that the model fit worsened after eliminating these cases, a decision was made to maintain them because 'they should be maintained, unless there is a test that demonstrates they are true abnormalities and are not representative of the observations made of the populat0ion' (Hair *et al.*, 1995)*. If an outlier presents a Cook distance under 1, it does not need to be eliminated as it will not have a strong effect on the regression analysis (Stevens, 1992).

The condition indices provided in Tables 4 and 5 revealed that the estimated models were not affected by multicollinearity problems. The condition index of the last component was high in both models (Belsey *et al.*, 1980). The 95% variance in this component corresponded to a single variable (LOGA), which ruled out the collinearity problem. Additionally, Table 6 shows the correlation matrix of the independent variables. No high correlations were detected between independent variables, which suggests that there were no multicollinearity problems.

The graphical analysis of studentised residuals also indicated that the models had no heteroskedasticity, and the normality tests (Kolmogorov-Smirnov and Shapiro-Wilk) of these residuals permitted the normality condition to be verified. At this point, the apparent contradiction of the results thrown up by the normality tests in Model 2 (Table 5) should be pointed out, given that although the Kolmogorov-Smirnov test verified the normality hypothesis, the opposite occurred when applying the Shapiro-Wilk test. Therefore, the graphical analysis of studentised residuals was used (histogram and normal probability graph, which are not included in the paper because of space constraints) as this verified that the residuals presented normal distribution and, as a result, the theoretical value of the regression complied with the normality test (Hair *et al.*, 1995).

Table 6. Correlation matrix.

	DEPR	SELF	ACOM	LIQ1	LOGA	TURN	TATU	LIQ2	MEMB	SETT
DEPR	1.000									
SELF	0.012	1.000								
ACOM	-0.003	0.340[**]	1.000							
LIQ1	0.220[*]	0.385[**]	-0.033	1.000						
LOGA	-0.259[**]	-0.101	0.020	-0.163[*]	1.000					
TURN	-0.082	-0.153	0.103	-0.117	0.403[**]	1.000				
TATU	-0.176[*]	-0.039	0.219[*]	-0.047	0.189[*]	0.342[**]	1.000			
LIQ2	-0.074	0.059	-0.348[**]	0.017	0.067	-0.030	-0.184[*]	1.000		
MEMB	-0.086	-0.135	-0.084	-0.021	0.201[*]	-0.053	0.316[**]	-0.117	1.000	
SETT	-0.108	-0.233[**]	-0.062	-0.146	0.391[**]	0.784[**]	0.172[*]	0.121	-0.071	1.000

[*] and [**] denote significance at the 0.05 and 0.01 levels, respectively.

5. Discussion

According to the results, no statistical evidence was found to confirm hypothesis H1, which sustains the trade-off theory in agricultural cooperatives. This hypothesis foresees a negative relationship between the depreciation variable and debt, so cooperatives can use this as a tax shield when no other tax advantages are available. This variable was not significant in the total debt model and the coefficient in the negotiated debt model was positive. There may be two reasons for this: these results seem to reinforce former research conclusions about the difficulty of providing empirical evidence for tax effects associated with this theory in the data (Frank and Goyal, 2009). It has also been suggested (Hennessy and Whited, 2005) that transaction costs may make the empirical identification of fiscal effects difficult, even when they are crucially important in the company. Cooperatives in Spain benefit from a substantive tax system and this justifies the fact that these entities do not consider borrowing as a form of tax shield. We should also underline the low relative weight that the depreciation expenses of the entities in the sample represent on average in relation to total expenses in the income statement (median of 3.5%), as the descriptive analysis revealed.

Conversely, however, the pecking order theory was confirmed as the self-financing variable obtained a significant result in both models. H_2 was also confirmed as this variable had the strongest effect on cooperatives' total debt, according to its standardised coefficient. The capacity to generate internal resources related negatively to the level of debt. Cooperatives are financed by resorting to either negotiated or non-negotiated debt only when internal resources are insufficient.

The argument of this financial theory entails having to resort to the basis of the economic theory of cooperativism. This focuses on relating the organisation's objectives to its conceptualisation, which distinguishes the typical investor-owned company objective of maximising profits from other goals that reflect cooperatives' dual nature; e.g. member benefits and the company's profitability (Soboh *et al.*, 2009). Cooperative principles lie in these entities' organisational practices: users control the entity through democratic decision-making structures; benefits for members are obtained through returns distributed to members according to their cooperative activity, settlements or fair prices, or through the possibility of accessing markets, suppliers and services (Bijman *et al.*, 2012). Although the duality of the above aims should strike a balance when designing agricultural producer cooperatives' strategy and actions, the reality of Spanish cooperativism is that these entities tend to prioritise the short-term objectives of maximising settlements to members as rewards, to the detriment of the entity's self-financing (Hernández-Espallardo *et al.*, 2013). For this reason, scarce self-financing leads to the financing sources used mainly becoming external sources. Regarding the use of own external sources (share capital), it is worth mentioning three highly relevant restrictions in cooperative societies: (1) their traditional problem of undercapitalisation; (2) the impact of public protection through

subsidies; (3) the way accounting regulations deal with cooperative share capital. When self-financing and share capital are not available, resorting to debt as a financing source is all that is left.

The results obtained herein are contradictory for H_3; that is, bigger investments in non-current assets encourage debt in cooperatives. This hypothesis was not confirmed for total debt, as the (ACOM) variable took a significant coefficient with a negative sign, but was confirmed for long-term (negotiated) debt. This finding for total debt is inconsistent with trade-off theory and pecking order theory predictions, which assume positive relationships between debt and non-current assets (Cole, 2013), but supports Hendrikse and Veerman's (2001) findings of the inefficiency of the cooperative form regarding investment decisions. This can also be explained by the definition of the dependent variable (DEBT) in the total debt model as this variable covers all cooperatives' debt, regardless of it being negotiated or not. In line with this, some research has indicated (Harris and Raviv, 1991) that investing more in non-current assets helps these entities obtain financing from banks and other credit companies. This justifies why the positive relationship between these variables is shown in the long-term debt variable (LT-DEBT), but is diluted in the entity's total debt, which also includes other liabilities for which economic structure (assets) composition is not a determining factor. The results of this model (DEBT) also contradicted the conclusions drawn by other authors (Barclay *et al.*, 2006; Frank and Goyal, 2009) on the predictive capacity of the long-term assets variable in the entity's debt. When debt is evaluated by its book value, a historic perspective is taken in which the variables that can explain it have to adopt the same perspective; e.g. the accounting composition of the entity's non-current assets, as verified in the model (LT-DEBT).

Regarding liquidity, as liquid assets can easily be converted into cash, which consequently reduces insolvency costs, the rejection of H_4 seems paradoxical, and also shows that agricultural cooperatives with a lower liquidity ratio are those that borrow more, given that model 1 showed a negative coefficient in the variable (LIQ1). Nonetheless, this conclusion is nuanced, especially when we consider that the (LIQ2) variable, which represents the entity's cash volume, presented a positive coefficient, but not a statistically significant one. The (LIQ1) variable considers liquid assets to be all the cooperative's current assets, including warehouse stock and accounts receivable items. In a situation of aversion to risk coupled with troubled economic times, this accumulation of current investments, which are hard to transform into cash, can curb borrowing policies. The negotiated debt model includes no cash-related variables. These conclusions corroborated the pecking order theory predictions, which postulated that more productive companies generate more retained profits, and apparently more liquid assets. Thus, their debt requirements are lower.

The results supported H_5, particularly in model 1; that is, a relationship between debt and cooperative size. However, the results revealed inconsistent performance for the variables used to model size, according to the more generalised trade-off theory hypothesis, which suggests a positive relationship. Previous works (Lajara-Camilleri and Mateos-Ronco, 2012) revealed that medium-sized cooperatives presented a higher percentage of debt. When considering the atomisation of the Spanish agricultural cooperative sector, where small- and micro-enterprises predominate, this conclusion corroborated the positive relationship predicted by the trade-off theory. From a static perspective, the negative coefficient in both models for the (LOGA) variable contradicted the expected relationship by indicating that entities with more assets usually borrow less. This fact can be explained within the pecking order theory framework: larger size reduces asymmetric information problems and implies that entities prefer their own financing (Rajan and Zingales, 1995). However, this conclusion seems to stray from the cooperative reality. In practice, the negative sign of the coefficient of this variable can be justified by issues of oversized facilities, which not only characterise a large number of agricultural cooperatives in Spain, but also generate glaring discrepancies between the volume of total assets and the production activities performed, with a subsequent loss of profitability. When examining the coefficients of the variables that model size from a perspective that better adapts to cooperatives' substantivity, and based on the activity performed and the number of members, those with greater turnover per member tend to incur in more debt. Thus, even when the value of its standardised coefficient was significantly less relevant, it indicated a positive relationship for the number of members variable, but was not statistically

significant. However, we were unable to apply this argument to negotiated debt as these variables were non-significant in model 2.

The regression analysis results tested H_6. They showed a significant relationship between cooperative performance and its level of debt. Yet these effects differed in both models. The total debt model suggested pecking order theory predictions, and confirmed that total debt tended to be lower in the entities that performed better and, consequently, had more self-financing capacity, as indicated by the negative sign of the (TATU) variable coefficient. Yet, in general terms, this conclusion did not seem to be compatible with the poor self-financing culture that prevails in agricultural cooperatives, as supported by the negotiated debt model results. In this case, the positive variable sign was coherent with the trade-off theory interpretation, according to which the more profitable the cooperative, the less likely it is to default on its obligations, and the better the image it offers to creditors. All this helps improve its options of accessing the negotiated financing offered by financial institutions. The settlement per member variable (SETT) did not come over as significant in the analyses, but it is worth stressing the negative sign of its coefficients.

These ambiguous results seem to coincide with the literature. Former empirical research conducted into relationships between agricultural cooperatives' performance and their financing decisions had not provided conclusive results. With a sample of Canadian fruit and vegetable cooperatives, Hailu *et al.* (2005) demonstrated that borrowing levels negatively affected a cooperative's efficiency, estimated by a costs function. Other authors (Chavas and Aliber, 1993; Nasr *et al.*, 1998) have reported positive relationships between efficiency and borrowing, but with different types of nuances to measure the efficiency and nature of borrowing. It is possible that the divergences encountered in these empirical studies are due to the varying performance measures and different methodologies employed, and to the broad range of conditions with which companies in different countries aim to access credit (Weill, 2008), or to diverse structural and economic situations. All these factors mean that it is not feasible to generalise results and that more detailed research work is required.

6. Conclusions and implications

Agricultural cooperatives play a determining role in farming as they enable producers to access markets and can capture higher added value rates in the food supply chain. Growth is a major element in a cooperative's strategy, not only to strengthen its bargaining power in a chain that is closely controlled by certain operators, but also to enable the heavy investment required for innovation, product development and internationalisation. Indeed, there is a direct link between cooperative size and their market position, as revealed by data taken from the main agricultural cooperatives in Spain and the rest of Europe. According to COGECA (2010), the top 25 European agricultural cooperatives in 2008 had a mean turnover of €4.23 million and almost 27,500 members per entity.

The economic relevance of agricultural cooperatives in Spain and elsewhere in Europe justifies the need to analyse the conditions of these entities so they can access the financing that suits their requirements. The results of this research have helped us to acquire more knowledge about the factors that determine the financing structure of agricultural cooperatives and its implications in their management. This is the first step to improve the conditions they need to access external funding, cut transaction costs and optimise their financing policies. The present work offers several contributions. First, it provides evidence about which financing theory best predicts the capital structure of agricultural cooperatives in Spain. Although these theories have not been designed with a general aim in mind, these entities tend to come closer to the pecking order theory when making financial decisions. Second, it puts forward a series of factors whose influence on agricultural cooperatives' leverage has been demonstrated, and it distinguishes between total debt and negotiated debt. The strong predictive capacity obtained for the total debt model should be highlighted.

Sample characterisation has enabled us to obtain an image of Spanish agricultural cooperativism. The descriptive analysis shows entities whose financing structure is balanced between liabilities and equity, with hardly any long-term debt. Consequently, most debt appears to correspond to trade credit, which

evidences a natural aversion to risk that has increased during troubled economic times. The relative weight of equity, considering both the expected undercapitalisation of these entities and the influence of compulsory endowments to specific reserve funds is justified by the impact of public policies that support cooperatives through subsidies. In Spain, as in other EU Member States, cooperatives are organisations that belong to the Social Economy which give their members notable social benefits that go beyond economic gain. This justifies the public support they receive (Brusselaers *et al.*, 2014). In fact, and according to the framework put forward by Williamson (2000), the institutional environment is recognised as one of the most important conditions for the success of organisations. This institutional environment refers to the legal system or formal rules, such as constitutions, laws and property rights, and reinforces the fact that the legal system matters to the development of cooperatives (Liang *et al.*, 2015b).

The regression analysis results do not provide overwhelming evidence to argue that Spanish agricultural cooperatives employ debt as a tax advantage, most probably because of the special protection they receive in the Spanish tax system. In fact, the positive relationship found between negotiated debt and depreciation expenses seems to respond to the historic investment policies made by these organisations in their facilities, which increases both endowments to depreciation and the need for financial resources to make these investments.

In financing source pecking-order terms, our results indicate that these entities only resort to external funding if they do not have sufficient internal means, which reveals a highly conservative financial outlook. This conclusion comes over consistently in other reported results (Van der Krogt *et al.*, 2007), which describe agricultural cooperatives as entities that are classically characterised by their aversion to risk with higher share capital restrictions than investor-owned companies. So, the theoretical importance of self-financing as a financial resource for these entities is logical. The question is whether it is a choice or a necessity due to the limited access cooperatives have to the capital market. Notwithstanding, practice has revealed a poor self-financing policy to the detriment of retained profits because, unlike other companies, Spanish agricultural cooperatives maximise settlements to members for the products that they deliver to the cooperative. Some authors have pointed out that for members, the prices they receive is the most valued indicator of the degree of cooperative performance. This might indicate that members act more like suppliers than owners. Consequently, their main concern is to achieve short-term results (Dunn, 1988). This short-term perspective of members' objectives is not coherent with the growth objectives required in today's companies. The importance of self-financing during periods of financial difficulty is emphasised and goes beyond the immediate interests of the members who act as the entity's suppliers.

The results in the pecking order theory are consistent with former research, and reveal that investments in non-current assets facilitate cooperative access to negotiated financing. According to this theory, cooperatives with more liquidity appear to borrow more, although this debt seems to correspond to short-term debt, according to the descriptive analysis.

The relationships between debt and cooperative size reveal that the cooperatives which have a higher turnover per member tend to borrow more. This indicates that they are more dynamic cooperatives in terms of trade activity, and tend to incur larger financing risks to develop their growth and internationalisation requirements.

Finally, the results obtained for the relationship between performance and debt levels are not conclusive because, although there is evidence of a significant relationship between them, which is coherent with former research theories, they cannot be generalised. The relationship with total debt is consistent with the pecking order theory, but is not coherent with cooperatives' operating policies. For negotiated debt, performance has a positive effect on debt as it increases the chances of cooperatives gaining access to finance from credit entities. These results require more research work to define a sufficiently robust variable that models cooperative performance, and verify its statistical relationships in an entity's financing structure.

The results of the present work are conditioned by the effect of the macro-economic context of the analysed time horizon, which means that the factors that come over as being determining, and their impact on

cooperative debt, are likely to vary over time. Previous research has revealed that significant changes occur in explanatory models with time (Frank and Goyal, 2009), so empirical research must continue to work along these lines in order to progress.

References

Abad, D., J.P. Sánchez-Ballesta and J. Yagüe. 2017. The short-term debt choice under asymmetric information. *SERIEs-Journal of the Spanish Economic Association* 8(3): 261-285.

Arcas, N., D. García and I. Guzmán. 2011. Effect of size on performance of Spanish agricultural cooperatives. *Outlook on Agriculture* 40(3): 201-206.

Arcas-Lario, N., J.F. Martín-Ugedo and A. Mínguez-Vera. 2014. Farmers' satisfaction with fresh fruit and vegetable marketing Spanish cooperatives: an explanation from Agency Theory. *International Food and Agribusiness Management Review* 17(1): 127-146.

Barclay, M.J., E. Morellec and C.W. Smith Jr. 2006. On the debt capacity of growth options. *Journal of Business* 79: 37-59.

Belsey, D.A., E. Kuh and R. Welsch. 1980. *Regression diagnostics: identifying influential data and sources of collinearity*. Willey, New York, NY, USA.

Bijman, J., C. Iliopoulos, K.J. Poppe, C. Gijselnckx, K. Hagerdorn, M. Hanisch, G.W.J. Hendrikse, R. Kühl, P. Ollila, P. Pyykkönem and G. van der Sangen. 2012. Support for farmers' Cooperatives. Final Report. European Commission, Agriculture and Rural Development, November. Available at: http://tinyurl.com/yb7u2xe3.

Boletín Oficial del Estado (BOE). 1990. Law 20/1990, of 19 December, of tax regime of cooperatives, no. 304, of 20 December. Available at: https://www.boe.es/buscar/doc.php?id=BOE-A-1990-30735.

Brusselaers, J., K. Poppe and T. García-Azcárate. 2014. Do policy measures impact the position and performance of farmers' cooperatives in the EU? *Annals of Public and Cooperative Economics* 85(4): 531-553.

Cechin, A., J. Bijman, S. Pascucci and O. Omta. 2013. Decomposing the member relationship in agricultural cooperatives: implications for commitment. *Agribusiness* 29(1): 39-61.

Challita, S., P. Sentis and P. Aurier. 2014. Do cooperatives perform better tan investor owned firms. The impact of governance on financial structure and performance. In: *Cooperatives' power to innovate: texts selected from the international call for papers,* edited by L. Hammond Ketilson and M.P. Ribichaud Villettaz. International Summit of Cooperatives, Quebec, Canada, pp. 503-519.

Chavas, J. and M. Aliber. 1993. An analysis of economic efficiency in agriculture: a nonparametric approach. *Journal of Agriculture and Resource Economics* 18(1): 1-16.

COGECA. 2010. Agricultural cooperatives in Europe. Main issues and trends. Available at: http://www.agro-alimentarias.coop/ficheros/doc/03020.pdf.

Cole, R.A. 2013. What do we know about the capital structure of privately held US firms?. Evidence from the surveys of small business finance. *Financial Management* Winter: 777-813.

Cooperativas Agro-alimentarias España. 2014. OSCAE. Observatorio socioeconómico del cooperativismo agrario español. Macromagnitudes del cooperativismo agroalimentario Español. Available at: http://www.agro-alimentarias.coop/ficheros/doc/04859.pdf.

Deangelo, H. and R. Masulis. 1980. Optimal capital structure under corporate and personal taxation. *Journal of Financial Economics* 8: 3-29.

Dunn, J.R. 1988. Basic cooperative principles and their relationship to selected practices. *Journal of Agricultural Cooperation* 3: 83-93.

Frank, M. and V. Goyal. 2009. Capital structure decisions: which factors are reliably important? *Financial Management* 38: 1-37.

Graham, J. and C. Harvey. 2001. The theory and practice of corporate finance: evidence from the field. *Journal of Financial Economics* 60(2-3): 187-243.

Hailu, G., E.W. Goddard and J.S. Jeffrey. 2005. Measuring efficiency in fruit and vegetable co-operatives with heterogeneous technologies in Canada. American Agricultural Economics Association Annual Meeting, July, Long Beach. Available at: http://ageconsearch.umn.edu/record/19507.

Hair, J.F., B. Black, R. Anderson and R. Tatham. 1995. *Multivariate data analysis: text and readings.* MacMillan, Basingstoke, UK.

Hansen, M.H., J.L. Morrow Jr and J.C. Batista. 2002. The impact of trust on cooperative membership retention, performance, and satisfaction: an exploratory study. *International Food and Agribusiness Management Review* 5(1): 41-59.

Harris, M. and A. Raviv. 1991. The theory of capital structure. *Journal of Finance* 46: 297-356.

Hendrikse, G.W.J. and C.P. Veerman. 2001. Marketing cooperatives and financial structure: a transaction costs economic analysis. *Agricultural Economics* 26: 205-216.

Hennessy, C.A. and T.A. Whited. 2005. Debt dynamics. *Journal of Finance* 60: 1129-1165.

Hernández-Espallardo, M., N. Arcas-Lario and G. Marcos-Matás. 2013. Farmers' satisfaction and intention to continue membership in agricultural marketing co-operatives: neoclassical versus transaction cost considerations. *European Review of Agricultural Economics* 40(2): 239-260.

Heyder, M., C. Makus and L. Theuvsen. 2011. Internacionalization and firm performance in agribusiness: empirical evidence from European cooperatives. *International Journal on Food System Dynamics* 2(1): 77-93.

Höhler, J. and R. Kühl. 2014. Position and performance of farmer cooperatives in the food supply chain of the EU-27. *Annals of Public and Cooperative Economics* 85(4): 579-595.

Hol, S. and N. van der Wijst. 2008. The financial structure of nonlisted firms. *Applied Financial Economics* 18(7): 559-568.

Huyghebaert, N. and L.M. van de Gucht. 2007. The determinants of financial structure: new insights from business start-ups. *European Financial Management* 13(1): 101-133.

Jensen, M.C. 1986. Agency costs of free cash flow, corporate finance and takeovers. *American Economic Review* 76(2): 323-329.

Jensen, M.C. and W.H. Meckling. 1976. Theory of the firm: managerial behavior, agency costs and structure. *Journal of Financial Economics* 3: 305-360.

Kalogeras, N., J.M.E. Pennings, T. Benos and M. Doumpos. 2013. Which cooperative ownership model performs better? A financial-decision approach. *Agribusiness* 29(1): 80-95.

Kalogeras N., J.M.E. Pennings, I.A. Van Der Lans, P. García P and G. Van Dijk. 2009. Understanding heterogeneous preferences of cooperative members. *Agribusiness* 25(1): 90-111.

Karami, E. and K. Rezaei-Moghaddam. 2005. Modeling determinants of agricultural production cooperatives´performance in Iran. *Agricultural Economics* 33: 305-314.

Kyriakopoulos, K., K. Meulenberg and J. Nilsson. 2004. The impact of cooperative structure and firm culture on market orientation and performance. *Agribusiness* 20(4): 379-396.

Lajara-Camilleri, N. and A. Mateos-Ronco. 2012. Financial structure and business achievement in agricultural cooperatives: an empirical approach. *Agricultural and Resource Economics* 12(2): 77-101.

Lerman, Z. and C. Parliament. 1991. Estimating the accounting profitability of pooling cooperatives. *Journal of Agribusiness* Fall: 3-11.

Levy, A. and C. Hennessy. 2007. Why does capital structure choice vary with macroeconomic conditions? *Journal of Financial Economics* 54: 1545-1564.

Liang, Q., G. Hendrikse, Z. Huang and X. Xu. 2015b. Governance structure of Chinese farmer cooperatives: evidence from Zhejiang province. *Agribusiness* 31(2): 198-214.

Liang, Q., Z. Huang, H. Lu. and X. Wang. 2015a. Social capital, member participation, and cooperative performance: evidence from China's Zhejiang. *International Food and Agribusiness Management Review* 18(1): 49-78.

Modigliani, F. and Miller, M. 1958. The cost of capital, corporate finance and the Theory of Investment. *American Economic Review* 48(4): 262-297.

Murray, F. and V. Goyal. 2003. Testing the pecking order theory of capital structure. *Journal of Financial Economics* 67(2): 217-248.

Myers, S. 2001. Capital structure. *Journal of Economic Perspectives* 15: 81-102.

Nasr, R., P.J. Barry and P.N. Ellinger. 1998. Financial structure and efficiency of grain farms. *Agricultural Finance Review* 58: 33-48.

Rajan, R. and L. Zingales. 1995. What do we know about capital structure?. Some evidence from international data. *Journal of Finance* 50(5): 1421-1460.

Soboh, R.A.M.E., A.O. Lansink and G. van Dijk. 2010. Distinguishing dairy cooperatives from investor-owned firms in Europe using financial indicators. *Agribusiness* 27(1): 34-46.

Soboh, R.A.M.E., A.O. Lansink, G. Giesen and G. van Dijk. 2009. Performance measurement of the agricultural marketing cooperatives: the gap between theory and practice. *Review of Agricultural Economics* 31(3): 446-469.

Sogorb, F. 2005. How SME uniqueness affects capital structure: evidence from 1994-1998 Spanish data panel. *Small Business Econonomics* 25(5): 447-457.

Stevens, J. 1992. *Applied Multivariate Statistics for the Social Sciences* (2nd Edition). Erlbaum, Hillsdale, NJ, USA.

Swinnen, J.F.M. and M. Maertens. 2007. Globalization, privatization, and vertical coordination in food value chains in developing and transition countries. *Agricultural Economics* 37: 89-102.

Trenzado, G. 2013. Las cooperativas en la UE. El modelo Nórdico y el modelo Mediterráneo. In: *El papel del cooperativismo agroalimentario en la economía mundial*, edited by Baamonde, E. Mediterráneo Económico 24, Madrid, Spain, pp. 119-138.

Van der Krogt, D., J. Nilsson and V. Høst. 2007. The impact of cooperatives' risk aversion and equity capital constraints on their inter-firm consolidation and collaboration strategies – with an empirical study of the European dairy industry. *Agribusiness* 24(4): 453-472.

Wald, J. 1999. How firm characteristics affect capital structure: an international comparison. *The Journal of Financial Research* 22(2): 161-187.

Weill, L. 2008. Leverage and corporate performance: does institutional environment matter? *Small Business Economics* 30(3): 251-265.

Williamson, O.E. 2000. The new institutional economics: taking stock, looking ahead. *Journal of Economic Literature* 38(3): 595-613.