Willingness to Invest in Agricultural Cooperatives: Evidence from Greece

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Abstract

This paper uses logistic regression to analyze the characteristics that determine Greek farmers' willingness to invest in agricultural cooperatives. The data are from a field survey of 235 Greek farmers – members of agricultural cooperatives in Thessaly and Western Macedonia regions. Although Greek farmers are commonly members of agricultural cooperatives, the majority are inactive. Therefore, it is important to identify motives that can increase farmers' commitment to the cooperative. In this paper, investment in cooperatives, which is vital for their sustainability, is assumed as an indicator of farmers' commitment to the cooperative. The regression results demonstrate that education, urban residence, participation in the cooperative's administrative procedures, as well as the farmers' perceptions of possible future strategies and previous managerial failures can positively affect members' decision to invest in the cooperative, confirming three of our initial hypotheses. On the other hand, the hypotheses that the existence of a successor in the farm and large farm size positively affect farmers' willingness to invest in the cooperative were rejected.

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Introduction

In Greece, there are more than 6,000 agricultural cooperatives with more than 700,000 members – almost all famers in Greece are members in at least one cooperative organization. However, the existing cooperatives produce little value for their farmer-members. Furthermore, they do not hold a significant market share in food supply chains (Iliopoulos 2012). An indicator of their low performance is that many secondary agricultural cooperatives have negative net positions and low working capital, while their equity capital was either insufficient or not efficiently utilized (Sergaki and Semos 2006; Chatzitheodoridis et al. 2013). Sergaki and Semos (2006) also report the average net profit of secondary cooperatives was – 420,000 € while the same figure for Investor owned Firms (IOFs) was 435,000 €.

Moreover, according to Iliopoulos and Valentinov (2012) the opportunistic behavior of cooperative leaders, which is supported and propagated by many politicians, has resulted in various types of organizational inefficiencies in the form of more than €850 million in debt (2005 estimate), low-quality products, inability to protect members' income, high transaction costs, and low investment levels. Due to internal opportunism, agricultural cooperatives suffer from so-called incentive problems (Cook 1995; Borgen 2004) that negatively affect their competitive survival (Salavou and Sergaki 2013). These problems discourage agricultural cooperative members from investing significant risk capital (Cook and Iliopoulos 2000) and lead to inefficient collective decision-making (Iliopoulos and Hendrikse 2009).

The consequences include not only a general belief among cooperative members that management boards make wrong decisions that lead to strategic failures, but also loss of market shares and general public distrust toward cooperatives as a sustainable business model (Demakis 2004). Because of the aforementioned situation, members' commitment to the cooperatives in Greece has decreased. Low commitment to agricultural cooperatives is one of the reasons why so many agricultural cooperatives in Greece are in fact without any business activity.

Farmers have to make three decisions concerning their participation in a cooperative. The first decision is about whether to become a member of the cooperative or not. Without sufficient membership, the cooperatives would not attain the operational size needed to benefit from potential economies of size and counteract the market power of their competitors (Bruynis et al. 2001). The second decision is about the degree of involvement of the members in the cooperative business. The cooperatives need their members to do business exclusively with the cooperative for the sake of increased market share and improved financial performance (Fulton and Gibbings 2000). The third decision concerns the

members' involvement in the democratic procedures of the cooperative by attending meetings, voting at general meetings, becoming an elected representative, etc. Member participation in the governance aspects of the organization gives cooperatives their distinctive character. These decisions characterize the levels of commitment to the cooperative organization (Mensah et al. 2012). Thus, membership, delivery of members' output to the cooperative, and members' commitment became important, complex, and sensitive issues in the development and progress of cooperatives (Othman et al. 2012; Chatzitheodoridis et al. 2013).

Cooperative members' commitment and their trust toward management boards are influenced by the members' economic background, age, and experience in the cooperative (Osterberg and Nilsson 2009). The member is committed to the cooperative if the cooperative returns a more favorable price, higher transaction profits, or some non-price advantages that cannot be copied by IOFs. At the same time, decreasing member commitment can lead to poor economic performance for the cooperatives (Fulton and Gibbings 2000). Declining member commitment is a concern even for countries with a long tradition of cooperatives (for example, the Netherlands). Thus, it is crucial for the cooperative managers not only to understand the factors that influence member commitment, but also to propose measures that can increase member commitment (Paulus 2012)

Trust among cooperative members is also important in determining group cohesion and performance (Hansen et al. 2002). As cooperative membership gets bigger and more heterogeneous, it is likely to affect members' commitment, democratic control, and cooperative success (Fulton 1999; Fulton and Giannakas 2001). The linkages between membership, patronage, and investment will also affect cooperative progress (Pischke and Rouse 2004). Increase in membership will increase members' share capital. As the capital held by the cooperative increases, the ability to invest in technology, training, and education will improve

Cooperative organizations are also seen as a form of social enterprise and a grass-root organization with the potential to help local communities. Various studies confirm the cooperatives' importance in community development in different countries and their role in poverty reduction (Birchall and Simmons 2008; Zeuli and Cropp 2004).

Cooperatives provide an alternative way of doing business in response to the economic problems of many farmers around the world. This is also the case for the Greek farmers. It is essential to establish incentive mechanisms for investment and to reduce operating costs so that cooperative organizations can grow and improve their efficiency (Chenzhong and Xinhong 2011). Hence, it is important to study cooperative members' willingness to invest.

In this paper, keeping in mind that in Greece almost all farmers are cooperative members, we investigate the factors that affect the willingness of farmer-members to invest in their cooperative by buying additional cooperative shares. The cooperative legislation in Greece allows members to purchase more than one share – if this is also allowed by the cooperative's internal regulations – as a way of raising capital. Moreover, these additional shares may be linked with additional votes, although not proportionally (up to a maximum of three votes per member). This legislation stimulates members to invest more in their cooperative. Logistic regression analysis has been applied to identify the characteristics that are more likely to influence farmers' willingness to buy additional cooperative shares.

Our study is an empirical contribution to the literature on the determinants of members' willingness to invest in their cooperative for a country, where cooperatives suffer from low efficiency and high distrust (Iliopoulos 2012). Our analysis further incorporates two subjective factors reflecting (1) members' perceptions of management failures in the past and (2) members' opinion of future strategic management.

The paper is organized as follows. The next section presents the data collection methodology, describes the empirical data and the variables used in the analysis, and formulates the research hypotheses. The sections that follow present the results of the analysis and a short discussion. The last section concludes.

Data, research methodology, and hypotheses

Data were collected through interviews with farmer-members in the first quarter of 2012 in the regions of Western Macedonia (Northern Greece) and Thessaly (Central Greece). From now on, "farmers" will refer to farmer-members who participated in this survey. Respondents were selected by convenience sampling and they were randomly chosen and interviewed after a number of visits to agricultural cooperatives. The number of the respondents was 235 after excluding some 20 incomplete cases.

The participants were asked to fill a two-part questionnaire. The first section (Table 1) contained the respondent's demographic profile as well as organizational and economic data for the respondent's farm (main activity, annual income level, involvement in non-farming activities, etc.). The respondents were also asked to state how often they attended general meetings and other common activities of their cooperative (represented by the variable "cooperative participation" in Table 1).

A separate question probed the possibility that the farmer would buy additional shares if the cooperative undertook a new investment project. We intentionally

chose to measure willingness to invest instead of the actual investment due to data limitations. Based on their answers, the respondents were categorized as either "willing to invest" or "unwilling to invest". This categorization created a binary variable that was used in a logistic regression model to estimate the likelihood of investing in the cooperative (dependent variable) as a function of a set of independent (explanatory or predictor) variables, which include farmer's personal characteristics as well as farm characteristics.

The second section collected information about the respondent's cooperative organization. The respondents were asked to evaluate the cooperative's economic effectiveness on a scale of 1 = not effective to 5 = very effective (Table 1). In addition to this characterization of cooperative effectiveness, the respondents were asked to evaluate, also on a five-level Likert scale, the most common managerial failures that they ascribe to their cooperative management board. The nine managerial failures included in this question (Table 2) are those most frequently reported by similar surveys for Greek agricultural cooperatives (Patronis 2002; Iliopoulos 2012; Kontogeorgos et al. 2013). Factor analysis was applied to reduce the nine managerial failure to three factors (Table 2). In addition to failure, the respondents were asked to evaluate a series of possible marketing and management strategies that would be beneficial, in their view, for their cooperative organizations to follow. The seven future strategies (Table 3) were reduced by factor analysis to two factors.

Binary logistic regression is most useful in cases where we want to model the event probability for a categorical response variable with two outcomes. The logistic regression model is a type of generalized linear model that extends the linear regression model by linking the range of real numbers to the range or probabilities 0-1 (Field 2005). The logistic regression model estimates the event probability Z as a nonlinear (logistic) function of a set of predictors. For each predictor j, a coefficient b_j is estimated, whose sign shows the effect (positive or negative) of the predictor variable on the probability of the event.[4] The exponential transformation of b_j, $Exp(b_j)$, is the predicted change in odds for a unit increase in the predictor. When $Exp(b_j)$ is less than 1, increasing values of the variable correspond to decreasing odds of the event's occurrence. When $Exp(b_j)$ is greater than 1, increasing values of the variable correspond to increasing odds of the event's occurrence.

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4   The estimation is by an iterative maximum likelihood method (Field 2005). The significance of the estimated coefficients is measured by the Wald statistic, which is the ratio of bj to standard error squared. In this study, SPSS v.15 was used as the software for logistic regression.

Table 1: Variable description

Variables	Description and coding	Mean	Std. deviation
Dependent variable			
Willingness to invest in agricultural cooperative	Are respondents willing to invest in the cooperative? (buy more shares = 1, otherwise = 0)	0.17	0.377
Independent variables			
Sex (S)	Male (1)/Female (2)	1.28	0.450
Age (A)	Five age categories (1: 18-27, 2: 28-37, 3: 38-47, 4: 48-57, 5: 58+)	2.97	1.082
Marital status (MS)	Single (1)/Married (2)	1.79	0.518
Residence area (Res_Area)	Three types of respondent's residence area: (1: urban, 2: semi urban, 3: rural)	1.78	0.838
Primary occupation (P_O)	Income exclusively from agriculture (1)/also from other sources (2)	1.23	0.422
Education (Edu)	Four education levels (1: <9 years, 2: 9 to 12 years, 3: 12 to 14 years; 4: more than 14 years)	2.60	0.975
Income (inc)	Five income levels (1: <12 k€, 2: 12 to 24 k€, 3: 24 to 36 k€, 4: 36 to 48 k€, 4: >48 k€)	2.71	1.411
Questionnaire area (Q_A)	Where the questionnaire was filled (1: Thessaly, 2: Western Macedonia)	1.25	0.432
Land owned (L_O)	Five levels of owned land, (1: <5 ha, 2: 5-10 ha, 3: 10 -15 ha, 4: 15-20 ha , 5: more than 20 ha)	1.86	1.022
Successor (Suc)	Is there anyone to take over your farm after your retirement? (1: No, 2: Uncertain, 3: Yes)	1.98	0.879
Farm type (F_T)	Five different farm types according to main activity (1: field crops, 2: vegetables, 3: fruit, 4: greenhouses, 5: other)	3.49	1.418
Cooperative participation	Five levels of participation in the cooperative's democratic control procedures (from 1: always to 5: never)	2.66	1.466
Cooperative characterization	Five levels of the cooperative's economic effectiveness (from 1: not effective to 5: very effective)	3.42	0.998

Sample size: 235 cooperative members in Thessaly and Western Macedonia (Greece).

The independent variables for the logistic regression model were chosen based on the existing literature, which led to the formulation of five hypotheses.

Hypothesis 1: Willingness to invest in the cooperative varies with members' demographic characteristics. Demographics include age, sex, marital status, residence area, and education. Demographic characteristics have been associated with the horizon and portfolio problems in cooperatives (Cook, 1995). It is conjectured that farmers' characteristics affect their decision to buy additional cooperative shares. Education and residence in rural area are expected to have a positive effect on willingness to invest in the cooperative. Farmer's age, on the other hand, is expected to have a negative effect on willingness to invest due to the horizon problem.

*Hypothesis 2***:** Willingness to invest in the cooperative varies with farm size. Larger farmers would be less willing to invest in cooperatives than small ones (Wang and Huo, 2013). Income is considered as a proxy for farm size, because larger farms produce higher incomes. Thus, farmers with lower income are expected to be more willing to invest in the cooperative. Exclusive occupation on the own farm can also be regarded as a farm size indicator.

*Hypothesis 3***:** Willingness to invest in the cooperative varies with the cooperative members' commitment. Farmers with greater commitment to their organization are expected to be more likely to invest in the cooperative. Commitment in this study is proxied by the cooperatives members' participation in the general meetings.

*Hypothesis 4***:** Willingness to invest in the cooperative varies with the existence of a successor in the farm business (usually the young generation of family members – farmer's children). Farmers who know that they have a successor for their farm business are expected to invest more readily in the cooperative. This hypothesis was formulated bearing in mind the high average age of farmers in Greece and in Europe in general. Members' age is associated with the so-called horizon problem of cooperatives (Cook 1995). A successor in farm business provides a constant incentive for expansion and forward planning (Calus and Van Huylenbroeck, 2008) and the successor himself could increase on-farm investment (Viaggi et al., 2011). This "succession effect" was suggested by Kimhi et al. (1995), who suggested that the existence of a successor in a farm could motivate the principal decision-maker to invest and increase the current farm size. Nevertheless, they did not find empirical evidence for the "successor effect". Hence, we conjecture that the existence of a successor in a farm business could encourage farmers to plan for a longer horizon and thus increase the likelihood of investing.

Hypothesis 5: Members' willingness to invest in the cooperative is affected by members' perception of past managerial failures. The effect of what members

perceive as management failures (such as wrong decisions or managerial shortcomings) is uncertain: it may reduce willingness to invest if farmers are disappointed by the management's performance, or conversely, increase willingness to invest if farmers are prepared to rally around the failing management through a strong sense of commitment to the cooperative. The perception of management failures is captured by the constructed variables in Table 2.

   Hypothesis 6: Farmers are expected to be more willing to invest in the cooperative when they have a positive perception of the cooperative's future strategy. This effect is captured by a constructed variables in Table 3.

Results

Most of the independent variables for the logistic regression analysis of the willingness to invest are provided directly by the survey (Table 1). Only the perception variables required for testing Hypotheses 5 and 6 are not directly available from the survey questionnaire. Therefore, the first step of the analysis was to construct a latent variable based on farmers' opinion about their cooperatives' managerial failures and another latent variable based on the prospects for future strategies. For this purpose, factor analysis was applied to the two corresponding multi-item questions. The multi-item question about managerial failures attempted to elucidate the members' perceptions of the areas in which the cooperative management had failed (Table 2). The multi-item question about future strategies was addressed to cooperative members to elucidate their opinion of the future strategies that the cooperative should follow to avoid past managerial failures and low economic performance (Table 3). Factor analysis revealed three factors in the managerial failures question (Table 2) and two factors in the future strategies question (Table 3). Tables 2 and 3 show the factors after varimax rotation together with the corresponding factor loadings.[5] The factors of each variable were next transformed into uncorrelated factor scores (mean = 0, std. dev. = 1) by the Anderson–Rubin method (available in SPSS) in order to use them in

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5   Tables 2 and 3 show two performance measures: the KMO measure of sampling adequacy and Bartlett' sphericity test. KMO values close to 1 indicate that patterns of correlations are relatively compact and factor analysis yields distinct and reliable factors. Values between 0.7 and 0.8 (as in Tables 2 and 3) can be characterized as good (Field 2005). Bartlett's test of sphericity tests the hypothesis that the correlation matrix is an identity matrix, which would indicate that the variables are unrelated and therefore unsuitable for structure detection. Significance values less than 0.05 (as in Tables 2 and 3) indicate that factor analysis may be useful with the data.

the logistic regression model and estimate how these perception factors affect farmers' decision to invest in the cooperative.

Table 2: Factor analysis of the farmers' perceptions about the cooperative's past managerial failures (multi-item question)

Cooperative's operational drawbacks	Communalities	Factors		
		MF1	MF2	MF3
Lack of Funding and Recourses	0.632			0,763
Interest Conflicts among members and board	0.417	0.635		
Ineffective Board of Directors	0.715	0.844		
No new members. (or activate existing members)	0.672			0,792
The cooperatives' CEO (and his choices)	0.443	0.656		
The way the board elects the CEO	0.548	0.623		
Low educational level of the Board Members	0.531	0.661		
Members participation in strategic decision making	0.588		0,717	
Members' age	0.778		0,872	
Eigenvalue		2.771	1.450	1.102
Variance explained (%)		31.795	16.114	12.246
Total variance explained (%)	60.156			
KMO measure of sampling adequacy	0.714			
Bartlett's test of sphericity	χ^2(df 21) = 344.230, p=0.000			

Extraction method: Principal Component Analysis

Rotation method: varimax with Kaiser normalization (rotation converged in 5 iterations; only factor loadings with values above 0.4 are shown)

In Table 2, the first factor (MF1) explains, after rotation, 31.8% of the total variance. It can be named *top management failures* because it mainly includes managerial failures ascribed to the cooperative's board of directors and the CEO. The second factor (MF2) explains 16.1% of the total variance and it can be named *failure to motivate member participation*. This factor includes two items – member's age and member's participation in the decision-making process. The third factor (MF3) explains 12.2% of the total variance and corresponds to shortage

of resources and absence of new members entering the cooperative. This factor was named *failure to raise new capital.*

Table 3: Factor analysis of the farmers' perceptions about the cooperative's future strategy (multi-item question)

Cooperative's possible future strategies	Communalities	Factors	
		FS1	FS2
To increase added value of cooperative products	0.770		0.871
To produce diversified products	0.753		0.853
To insist on high-quality products	0.288	0.537	
To invest in personnel and personnel development	0.517	0.719	
To attract well-educated and experienced personnel (as IOFs do)	0.168		0.407
To invest in internal business organization (increase its effectiveness)	0.646	0.722	
To cooperate with agricultural research centers or universities	0.683	0.794	
Eigenvalue		2.617	1.450
Variance explained (%)		37.390	17.256
Total variance explained (%)		54.646	
KMO measure of sampling adequacy		0.709	
Bartlett's test of sphericity		χ^2 (df 21) = 347.124, p=0.000	

Extraction method: Principal Component Analysis

Rotation method: varimax with Kaiser normalization (rotation converged in 3 iterations; only factor loadings with values above 0.4 are shown)

In Table 3, the first factor (FS1) explains, after rotation, 37.4% of the total variance. It can be named *quality orientation* because it includes strategies related to quality attributes, such as production of high quality products, investment in personnel development, cooperation with research centers and universities, and efficiency improvement through investment in internal business organization. The second factor (FS2) explains 17.3% of the total variance and can be named *sophisticated strategies*. This factor includes three policy items related to general diversification, emphasis on high added-value products (such as Protected Designation of Origin (PDO) products, well-designed packaging, etc.), and advanced recruitment strategies similar to those used by IOFs.

Farmers' willingness to invest in cooperatives was analyzed by logistic regression. This methodology had been used in some prior studies (Mensah et al. 2012; Fulton and Adamowicz 1993) to examine cooperative participation, commitment, and willingness to invest. The estimation was performed by the method of forward stepwise input of the variables, with the aim of including in the final model only the variables that have a statistically significant effect on the farmers' decision. Table 4 presents the estimation results. The model adequately fits the data (Hosmer–Lemeshow statistic is 0.683). It correctly classifies 86.4% of respondents (93.1% among those unwilling to invest and 53.8% among those willing to invest).

**Table 4: Logistic regression analysis for characteristics
that affect members' willingness to invest**

Variables	Coefficient B	S.E.	Wald statistic	Wald Sig.	Exp(B)
Education (Edu)	0.685	0.235	8.468	0.004*	1.984
Residence area (Res_Area)					
Res_Area (2)	1.040	.662	2.470	0.116	2.829
Res_Area (3)	-0.585	0.296	3.914	0.048**	0.557
Existence of successor (Suc)					
Suc (2)	0.333	0.467	0.507	0.476	1.395
Suc (3)	-1.738	0.749	5.390	0.020**	0.176
Cooperative participation	0.841	0.183	21.145	0.000*	2.318
Quality orientation (FS1)	0.720	0.338	4.541	0.033**	2.054
Failure to raise new capital (MF3)	0.832	0.282	8.723	0.003*	2.299
Constant term	-5.438	1.162	21.888	0.000*	0.004

$R^2 = 0.683$ (Hosmer–Lemeshow)

Significance: * $p<0.01$, ** $p<0.05$, *** $p<0.1$

Note: Res_Area and Suc both have 3-level outcomes (see Table 1 for level coding). For both variables, the lowest value is taken as the reference level. Res_Area (2) and Res_Area (3) are respectively coefficients representing the difference between level 2 (semi urban) and level 1 (urban) and between level 3 (rural) and level 2 (semi urban). Similarly, Suc(2) is the coefficient representing the difference between level 2 (uncertain) and level 1 (no successor); Suc(3) is the coefficient representing the difference between level 3 (no successor) and level 2 (uncertain).

As far as the model itself is concerned, six factors were identified as statistically significant determinants of willingness to invest in the cooperative (Table 4). They include education (Edu), the residence area (Res_Area), the existence of a successor (Suc), extent of participation in the cooperative, the quality orientation factor (FS1), and the factor signifying failure to raise new capital (MF3). All the other variables included in the model specification dropped out as not significant during the forward stepwise procedure. Cooperative participation and failure to raise new capital have the greatest positive marginal effect on the likelihood to invest in a cooperative. The existence of a successor and the farmer's residence in a rural area surprisingly have the greatest negative marginal effect on the probability of investing in an agricultural cooperative.

We now proceed with the interpretation of the results according to the initial hypotheses (H1-H6). Only the statistically significant variables that influence farmers' decision to invest in the cooperative (Table 4) are discussed in the next section.

Discussion

The hypothesized factors affecting the decision to invest in cooperatives were the demographic characteristics of the farmers (H1), farm size (H2), the farmer's commitment to the cooperative (H3), the existence of a successor in the farm business (H4), the member's perceptions of past managerial failures (H5), and the member's perception of the cooperative's future strategies (H). Evidence from the estimated willingness-to-invest model confirms hypotheses H1, H3, H5, and H6 but does not confirm hypotheses H2 and H4.

According to H1, investment in cooperatives is positively associated with education and residence in rural area. It is hypothesized that better educated farmers and farmers living in rural areas should have a better understanding of cooperative advantages and therefore be more willing to invest in the cooperative. Education indeed has a positive effect on willingness to invest: the coefficient of Edu in Table 4 is positive. On the other hand, the coefficient for residence in rural area Res_Area(2) is negative compared to the base residence in urban area (the corresponding Exp(B) is less than 1). Thus, contrary to our hypothesis, farmers in rural areas appear to be less willing to invest in cooperatives than farmers in urban area. This may be attributable to the higher income levels of the urban population, which allows them more freedom to invest than among the less wealthy rural

residents.[6] Farmer's age (which is often assumed to have a negative effect on willingness to invest due to the horizon problem) is not statistically significant in the estimated model and it is omitted from Table 4.

According to H2, we expect income, as an indicator of farm size, to have a positive effect on the farmer's decision to invest in the cooperative, and yet the estimated coefficient of income is not statistically significant. Similar results were obtained by previous researchers (e.g., Wang and Huo 2013), and the association of farm size with member's commitment is still a controversial issue (see Mensah et al. 2012, p.19).

According to H3, participation in the general meetings of the cooperative is a measure of member's commitment to the cooperative organization. Being active in the governance of the cooperative is expected to increase the commitment to the cooperative (Bijman and Verhees 2011). Our estimation confirms that commitment is positively and strongly associated with willingness to invest in the cooperative.

According to H4, the existence of a successor in the farm business should have a positive impact on the farmer's decision to invest in the cooperative. Contrary to our expectations, the contribution of this factor in the estimated model is negative: the existence of a successor in the farm business reduces (strongly and statistically significantly) farmers' willingness to invest in their cooperatives (see the coefficient for Suc(2) in Table 4). The value of Exp(B) shows that, for a farmer with a successor, the odds of being willing to invest are 0.176 times the odds for a farmer without a successor in the farm (all other things being equal). Thus, farmers with a successor in the farm businesses are less willing to invest that farmers without a successor, and hypothesis H4 is rejected. It seems that, contrary to expectations, the existence of the successor does not correct the horizon problem and does not encourage farmers to invest for longer horizons (Cook 1995).

For H5 and H6, we studied two types of members' perceptions. The first one (H5) concerns their evaluation of the cooperative's managerial failures in the past.[7] The second (H6) is the member's perception of the cooperative's future strategies. Members who recognize that the cooperative management has failed in raising new capital (MF3) appear more willing to invest in their cooperative. Quality orientation as a future strategy (FS1) also has a strong positive effect on the farmer's willingness to invest in the cooperative. To sum up, these two perceptions affect positively farmer's willingness to invest in the cooperative.

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6   The mean income for farmers in urban areas is 2.83 and for farmers in rural areas 2.46 (average of categorical scores from 1 = less than €12,000 to 5 = higher than €48,000). The difference, however, is not statistically significant.

7   Past management failures are responsible for the severe debt problems that most Greek cooperatives face (Iliopoulos 2012; Kontogeorgos et al. 2013).

Conclusions

The objective of this paper was to explore the factors that affect farmers' willingness to invest in their cooperative organization by buying additional shares. This was the question in our survey addressed to 235 cooperative members in Central Greece (Thessaly) and Northern Greece (Western Macedonia). Logistic regression analysis has been applied to identify the most important characteristics that affect farmers' willingness to invest in their cooperatives. The results show that higher education and residence in urban areas (where income levels are higher) affect positively farmers' willingness to invest in their cooperative. Farm size does not affect the willingness to invest. Participation in administrative procedures (as a commitment indicator) is positively and significantly associated with the willingness to invest, confirming our initial hypothesis. Contrary to our hypotheses, however, the existence of a successor in the farm business has a statistically significant *negative* effect on the member's willingness to invest. This is a surprising result, as that the existence of a successor in the farm business should eliminate the horizon problem and stimulate farmers to seek long-term investments (see for example Calus and Van Huylenbroeck, 2008). This issue requires further research.

Finally, certain perceptions of the cooperative organization motivate farmers to invest more in their cooperative. Such perceptions include quality orientation as the cooperative's future strategy and difficulties raising capital as a managerial failure in the past. Members are willing to support investments oriented to promote product quality. Furthermore, the cooperative's difficulties in raising capital (from new or inactive members) may motivate existing cooperative members to invest, proving in this way their commitment to the cooperative.

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