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Effects of managers' power on capital structure: a study of Italian agricultural cooperatives

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Abstract

Excessive leverage is one of the most important problems facing Italian agricultural cooperatives as the competition in the EU intensifies. An empirical study of 500 agricultural cooperatives supports the hypothesis that cooperatives characterized as having "powerful managers" have a capital structure that is significantly different from the "nonpowerful manager" cooperatives. Powerful manager cooperatives were less leveraged and had a long term strategy that focused on minimizing financial risk by increasing their equity/asset ratio. The result of this strategy is an increased probability of long term international competitiveness. © 2001 Elsevier Science Inc. All rights reserved.

1. Introduction

The Italian food system is evolving rapidly. Although the driving forces and the direction of this change are not always clear, many authors agree that the future food system will be global, consumer oriented, and capital intensive. These three factors stretch the limits of traditional agricultural cooperatives, usually characterized by limited exports, rigidity in input supply and low equity (Dobson, 1998; Cook, 1993; Chesnik, 1997). This paper will focus on the capitalization issue since responding to global demands will be difficult for Italian cooperatives due to their excessive debt financing.

Most Italian agricultural cooperatives are in financial distress (as shown in Fig. 1) due to excessive leverage, which reduces a cooperative's efficiency by adding costs both in terms of higher transaction costs and missed profit opportunities (Manelli, 1996). Economic

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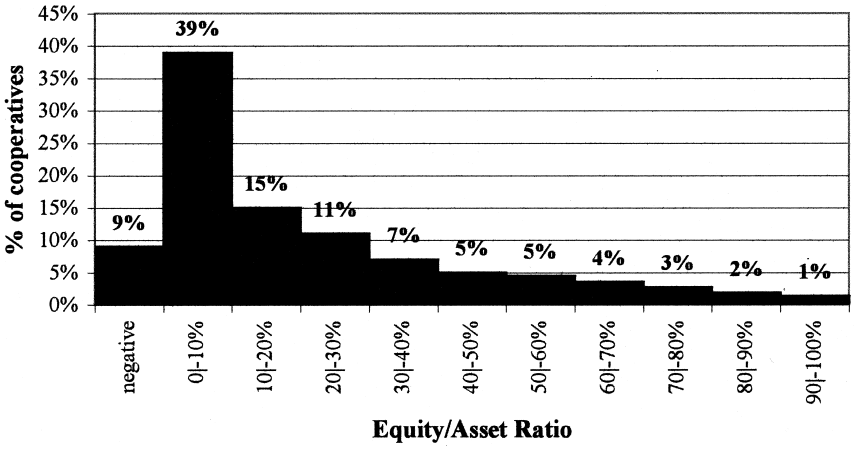

Fig. 1. The equity/asset ratio for 2,322 Italian agricultural cooperatives, 1995.

literature attributes these difficulties in building an efficient capital structure to various factors such as the absence of a secondary market for stock, the high opportunity cost of money for farmers and the investment horizon of patrons (Staatz, 1989; Murray, 1983; Vitaliano, 1983).

The undercapitalization of cooperatives in Italy has been hypothesized by many Italian authors (Iannello 1994, Mazzoli and Rocchi, 1996). This paper is the most extensive empirical study on this subject due to the new national data that were made available. Fig. 1 confirms the undercapitalization of Italian cooperatives. The data showed that, out of a sample of 2,322 Italian agricultural cooperatives, 48% had an equity/asset ratio lower than 0.10 (Confcooperative, 1998). Fiorentini (1995) compared the capital structure of a sample of Italian agricultural cooperatives with a sample of investor owned firms (IOFs) and found that cooperatives were relatively undercapitalized (0.4 equity/fixed asset ratio vs. 0.7 for IOFs). Cooperative undercapitalization is not exclusively an Italian problem. In the U.S., recent surveys show a decline in membership and patron equity levels (USDA, 1997). U.S. cooperative capitalization varies among industries: the average industry debt/assets ratio ranges from 0.49 for cotton to 0.81 for poultry/livestock (Chesnik, 1997). Although this paper focuses on Italian cooperatives, the conclusions may have global implications.

In this paper, the factors influencing Italian cooperatives' capital structure were analyzed using the coalition theoretical framework (Staatz, 1983). According to this framework, cooperative capitalization is influenced by the personal preferences of the individuals and groups composing the cooperative. An empirical test provided evidence of the framework's conclusions utilizing a new dataset about Italian cooperatives and focusing on Italian managers' power. The study hypothesis is that, when managers are able to influence the capital structure, cooperatives are less leveraged. The rationale of this hypothesis is discussed in the next section. The analysis has two steps: first an index was developed that represents cooperative managers' power, then, it was tested for its influence on the capital structure using a GLS regression model.

2. The model and the study hypothesis

The coalition theoretical framework states that a cooperative consists of many groups having different objectives and attempting to maximize their own individual utility even at the expense of other groups within the organization. This situation is particularly relevant to cooperatives because costs and benefits can be allocated among groups according to a multiplicity of rules. By setting prices for members' products, offering specific services and choosing capitalization strategies, the coalition decides which group will profit and which one will pay the cost of operations. Then, each group decides which strategy to support considering not only the total returns but also the way costs and benefits are allocated. Investments with low returns may become more attractive if it is possible to transfer a sufficient portion of the cost to another group. In this context, if the transaction costs between the groups are high enough, the adoption of Pareto-inefficient strategies is possible. In fact, if such transaction costs are higher than the increase in value caused by the efficient strategy, groups have no incentive to negotiate an efficient solution based on the compensation principle, as stated by the Coase theorem (Coase, 1960). As a consequence, the cooperative strategy will not be determined solely by an efficiency principle, but it may be influenced by the initial distribution of resources and power among the groups of the coalition.

This study evaluates the effects of the bargaining power of managers. According to the general formulation of the principal-agent model; if members are not able to monitor (and enforce) managers' behavior, then managers have the incentive to behave opportunistically by maximizing their own utility instead of the members'. Because Italian cooperative managers usually were compensated with fixed wages not based on performance, they are expected to support risk-minimizing strategies (reducing the bankruptcy risk) rather than to maximize members' return.[1] In determining the cooperative capital structure, managers are expected to show a preference for equity because high leverage increases the financial risk of the cooperative (Murray, 1983). This preference is assumed to be stronger if the risk of the cooperative business is high. Hence, the hypothesis is that when managers effectively influence the capital structure through their bargaining power, the cooperatives are less leveraged. The leverage level is measured through the equity/asset ratio of the cooperative, which we assume will be higher and positively associated with risk for cooperatives with powerful managers.

This hypothesis was tested using a new data set provided by the Confederazione Cooperative Italiane[2] including both financial and structural data. The original data set included 2,322 agricultural cooperatives. The 521 firm sample used in this analysis was selected based on two criteria: availability of a three-year time series and the availability of detailed information about the value of patronage refunds.[3] The federations of cooperatives were excluded from the sample because of their peculiar characteristics.[4]

3. Measurement of manager power

The first step in the analysis consisted of identifying cooperatives characterized as having effective manager's bargaining power (i.e., the ability to effectively influence the strategies

Table 1
Determining factors for manager power

Indicators	Description	Definition	Expected Correlation with Manager Power	Correlation with Equity/ Asset Ratio
PP_i	Percentage of revenues transferred to patrons	$\frac{pr_i + rm_i}{revenues_i}$ pr_i = patronage refunds rm_i = price paid for members' products	Negative	−0.1395
PC_i	Percentage of revenues retained by the cooperative	$\frac{NIAT_i + Dep_i + \Sigma\, app_{i,n}}{revenues_i}$ NIAT = net income after taxes dep = depreciation app = year's fund appropriations	Positive	0.1197
LM_i	Natural logarithm of the number of members	ln(n. of members)	Positive	0.3629
PM_i	Percentage of members attending annual meeting	N/A	Negative	−0.2531

by imposing his or her preferences on the groups within the cooperative). To identify cooperatives characterized as having effective manager's bargaining power, indicators were developed based on three assumptions:

1. Powerful managers can retain resources for the cooperative rather than pay them out to members. Managers have the incentive to keep resources within the cooperative where they can control them. Powerful managers reduce the resource transfer to members both in terms of profits, prices and patronage refunds.
2. Managers' power is directly related to the number of members. We assume that as the number of cooperative members increases so does the number of groups. If the groups are heterogeneous, which will likely be the case, the negotiation process between members becomes complicated and the transaction costs rise. Therefore, we assume that managers have more opportunities to impose their preferences if membership is large, heterogeneous and divided into numerous factions.
3. Managers' power is inversely correlated to members' participation in the cooperative. The more active members are in annual meetings and the decision making of the cooperative, the less power the manager has.

Given these assumptions, an index of effective manager bargaining power was developed, based on four indicators summarized in Table 1: percentage of revenues transferred to patrons, percentage of revenues retained by the cooperative, natural logarithm of the number of members, and percentage of members attending annual meetings. The first two indicators were derived from assumption 1, and they describe the ability of powerful managers to withhold resources, hence, reducing the profit margin of members. The other indicators derive directly from assumptions 2 and 3. Table 1 reports the absence of a significant linear

Table 2
Descriptive statistics for PMCs versus NPMCs, 1995 (US$ values in millions)

	PMC	NPMC	Average for Total Sample
Number of cooperatives	135	386	521
Average revenues	$6.79	$3.90	$4.85
Average net income after taxes	$0.93	$0.37	$0.48
Average equity	$1.36	$0.46	$0.75
Average total assets	$6.59	$3.41	$4.46

Source: Confcooperative.

correlation between the four indicators and the equity/asset ratio, showing the absence of tautologies in the model. The sign of the expected correlation with managers' power was derived from the stated assumption.

The indicators were aggregated into an overall power index (PW_i) calculated for each cooperative using 1995 data according to the following function:

$$PW_i = f(-PP_i) + f(PC_i) + f(LM_i) + f(-PM_i)$$

Where f is an operator such as:

$$f(x_{ij}) = \begin{cases} 1 & \forall\, x_{ij} > \bar{x_j} + \sigma_j \\ 0 & \forall\, \bar{x_j} - \sigma_j \le x_{ij} \le \bar{x_j} + \sigma_j \\ -1 & \forall\, x_{ij} < \bar{x_j} - \sigma_j \end{cases};$$

Where j denotes food-processing (value-added) versus non food-processing cooperatives because of the differences in the average values of the four indicators due to cooperatives' activity (see appendix A for details on the segregation); x_{ij} is the value of any of the four indicators for the i^{th} cooperative; $\bar{x_j}$ is the sample mean; σ_j represents the sample standard deviation.

Each indicator captures a different aspect of manager's power, and, when added together, they give a general power score that can range from -4 to $+4$. A positive value for PW_i denotes effective bargaining power of managers (Powerful Manager Cooperatives or PMC), whereas a negative PW_i implies its absence (Non-Powerful Manager Cooperatives or NPMC). Given the theoretical framework, PMCs were expected to pursue the maximization of managers' utility, whereas NPMCs were assumed to pursue members' utility maximization.

The first major result of this study is in Table 2, where the PMCs and the NPMCs are compared. The sample averages for the two types were compared, and in all accounts, these cooperatives were found to be distinctly different. Specifically, PMCs were financially larger in terms of revenues, equity and total assets.

Fig. 2 describes the difference in the distribution of the equity/asset ratio between the 135 PMCs and the 386 NPMCs of the study sample. It shows that 69% of the NPMCs have an equity/asset ratio lower than 0.1 compared to 40% of the PMCs. The average NPMCs'

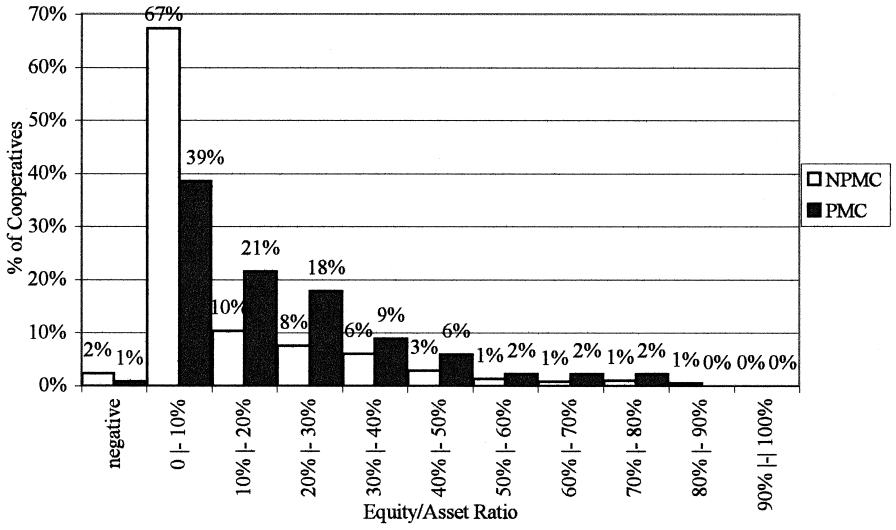

Fig. 2. Distribution of the equity/asset ratio for PMCs and NPMCs, 1995.

equity/asset ratio was 0.10 compared to 0.19 of PMCs.[5] A *t* test under the assumption of unequal variance comparing the equity/asset ratios showed that the two subsample averages were significantly different (1% significance level). The test provides the first empirical evidence of the incidence of power distribution among groups within the cooperatives on the capital structure: on average PMCs are significantly less leveraged than NPMCs. The empirical results support the theoretical framework and hypothesis.

Given the major finding to this point (a significant difference between PMCs and NPMCs in terms of their Equity/Asset ratio) we estimated a regression model in the next section to further investigate the different capitalization strategies.

4. The equity/asset regression model

In the previous section, an index for powerful manager cooperatives was specified and calculated. In this section a regression model was used to determine the factors that influence the equity/asset ratio for Italian agricultural cooperatives and to test differences in PMCs' capital structure. Table 3 gives a comprehensive explanation of all the variables used in the required model.

The regression utilizes some of the explanatory variables proposed by Barton, Parcell, and Featherstone (1996) for the determination of the optimal cooperative capital structure. The specific explanatory variables were: the cooperative profitability, the average interest rate and the variability of profitability. Unlike the Barton et al. model, the variance of the interest rate was not included in this analysis.[6] The dependent variable was the equity/asset ratio. Given the results of the Barton et al. model, the regression coefficients of these variables are expected to be positive. Profitable businesses should be able to attract equity, a high interest

Table 3
Explanatory variables of the GLS model

Variable	Description	Definition	Expected Sign
$prof_i$	A proxy for cooperative profitability	$\frac{pr_i + rm_i + NIAT_i + dep_i + \Sigma\, app_{n,i}}{revenues_i}$ pr_i = patronage refunds paid to members rm_i = price paid for members' products, $NIAT_i$ = net income after tax dep_i = depreciation, app = year's fund appropriations	positive
int_i	A proxy for the cost of debt financing	$\frac{intex_i}{TA_i - equity_i}$ $intex_i$ = interest expenses TA_i = total assets	positive
$asstr_i$	The ratio between fixed asset and total assets	$\frac{fixed\ assets}{total\ assets}$	positive
$vp9496_i$	A proxy for the variability of cooperative profitability	standard deviation ($prof_{i,t}$) t = 1994, 1995, 1996	positive
$valadd_i$	A dummy variable identifying food-processing cooperative	$valadd_i \begin{cases} = 1 & food - process.coop \\ = 0 & otherwise \end{cases}$	negative
pm_i	A dummy variable for powerful manager cooperatives	$pm_i \begin{cases} = 1 & \forall\, PW_i > 0 \\ = 0 & otherwise \end{cases}$	positive
$pm_i \cdot prof_i$ $pm_i \cdot int_i$ $pm_i \cdot asstr_i$ $pm_i \cdot vp9496_i$	instrumental variables evaluating the effect of powerful managers on the continuous variable coefficient	$\begin{cases} = prof,int,asstr\ or\ vp9496 & \forall\, pm = 1 \\ = 0 & \forall\, pm = 0 \end{cases}$	negative negative positive positive

rate should discourage debt financing and high profit variability calls for lower leverage to reduce the overall risk level.

To adapt the model to the Italian context, the fixed assets/total asset ratio and a dummy variable identifying the food-processing cooperatives were added. Hence, the investment structure and the activity of the cooperative become endogenous variables in the model. The regression coefficient of the fixed assets/total asset ratio is expected to be positive because balancing fixed investment with equity is considered a good management practice. The expected sign for the food-processing cooperative dummy variable is negative, given the specific characteristics of these firms (namely the different financial needs and asset structure).

Finally, a dummy variable identifying PMC was added, to test the study hypothesis. According to the standard dummy variable technique, all of the cross products of the powerful manager dummy variable and the continuous variables were included in the model. These variables were instrumental in capturing the influence of the presence of powerful managers on each individual coefficient. Thus, the specific impact on each factor was evaluated. The expected sign of these instrumental variables represents the expected change in the coefficient of the respective continuous variables due to the presence of powerful

Table 4
Equity/asset ratio GLS regression results

Variable	Coefficient	t-Stat
intecept	−0.0251	0.7764
prof	0.0925	*3.3134
int	1.9108	*12.1836
asst	0.3214	*6.8304
vp9496	−0.1007	1.2789
valadd	−0.0575	*3.3121
pm	−0.0046	0.0927
pm*prof	0.0580	1.0580
pm*int	−1.0148	*2.0719
pm*asst	0.1517	**1.7469
pm*vp9496	0.3928	*2.6641
GLS weighted regression R^2		0.5074
F-statistic		*52.5393
F-stat. for test on joint significance of all coefficient related to pm		*7.9294

* Significant at 1% level.
** Significant at 10% level.

managers. Thus, a decrease either in profitability or in interest rate was expected to have less impact in PMCs because managers, concerned about risk, would use their power to limit the use of debt. Conversely, an increase in the performance or operational risk was expected to have a greater impact on PMCs, given the risk minimizing preferences of the managers.

5. Results

The model was estimated using the GLS approach to correct for heteroskedasticity that was indicated by the Breusch Pagan test (significant at 1% level). The results of the equity/asset ratio regression model are shown in Table 4.

The signs of the continuous variable coefficients coincided with the expectations. The only exception was the variability in profits (vp9496), which was negative but not significant at the 10% level. Later in the paper, this result is explained when a comparison is made between NPMCs and PMCs. The sign on the dummy variable for manager power (pm_i) was negative which was contrary to expectations. However, the associated t-statistic showed that the coefficient was not significant at the 10% level.

The equity/asset ratio was positively correlated with the cost of financing, fixed asset/total asset ratio and cooperative profitability. These results are intuitive and they reflect the expectations. An increase in the interest rate makes equity sources more attractive, because it raises the cost of debt financing; a correlation between fixed assets and equity is considered good management to reduce risk induced by operating leverage; and high profitability may make members more willing to invest in the cooperative.

PMCs presented a significantly different equity structure than NPMCs. The *F*-test on the joint significance of all the parameters associated with the dummy variable for manager power (pm_i) and its cross-products was significant at the 1% level. This result provides statistical evidence of the influence of manager power in the determination of the equity/asset ratio. The individual *t* tests on the variables confirmed that PMCs are significantly different in all slope coefficients except profitability, meaning that these cooperatives react to changes in their environment by adopting different capital structure strategies. In particular, the results stress the differences in the reaction to a change in the cost of financing and profit variability (both statistically significant at 1% level). The signs of the instrumental variable are consistent with expectations, except for the cross product between the dummy variable for manager power (pm_i) and the profitability variable ($prof_i$) that is positive but not significant.

To provide more detailed insight into the capital structure of the PMCs and NPMCs, two additional regression equations were estimated. The same model was run independently for both PMCs and NPMCs. The first equation only has PMCs (135 cooperatives) and the second equation has only NPMCs (386 cooperatives).

Powerful Manager Cooperatives (135 observations, R^2: 0.35, F-stat: 11.38):

$$(E/A)_i = -0.05 + 0.16\,prof_i + 0.90\,intex_i + 0.30\,vp9496_i + 0.48 asst_i - 0.04\,valadd_i$$
t-stat: (0.43) (2.65)* (1.59) (1.95)** (5.33)* (1.15)

Non Powerful Manager cooperatives (386 observations, R^2: 0.48, F-stat: 68.86):

$$(E/A)_i = -0.01 + 0.09\,prof_i + 1.88\,intex_i - 0.11\,vp9496_i + 0.32\,asst_i - 0.07\,valadd_i$$
t-stat: (0.21) (3.39)* (12.82)* (1.49) (7.40)* (3.45)*

* Significant at 1% level
** Significant at 5% level

Compared to powerful manager cooperatives, NPMCs' had higher t-statistics for profitability (prof), asset structure index (asst), and interest rate (intex). The two types of cooperatives presented an opposite sign for the variability of profitability (vp9496): on average, given an increase in profitability PMCs will reduce the financial leverage, whereas NPMCs will increase it. Both NPMCs and PMCs reacted to an increase in the asset structure ratio by increasing equity. However, the PMC did show a higher sensitivity to the asset structure ratio. Changing the interest rate (ceteris paribus) was expected to have a significant influence on the capital structure of NPMCs; however, there was no definitive evidence of its influence on PMCs' leverage (the coefficient has a *p*-value of 0.11).

NPMCs' sensitivity to cost of financing may be explained by the members' concern about the profit margin reduction due to interest expenses. Powerful managers may be less willing to reduce equity even if the interest rate on debt decreases due to their risk-minimizing behavior (as we stated in the Model and the Study hypothesis sections). In fact, higher leverage implies higher risk even in the presence of low interest rates. The difference in coefficient signs for profit variability can be explained by the risk minimizing approach of

powerful managers (that led to lower leverage) and by the unwillingness of members to invest capital in a risky business.

The empirical results support the theoretical framework. The study hypotheses are both supported: we found that, when managers have effective bargaining power, cooperatives are actually less leveraged and their capitalization strategy is influenced by the managers' objectives (bankruptcy risk minimization).

6. Conclusions

Excessive leverage is one of the most important problems facing Italian agricultural cooperatives as the international competition in the EU intensifies. The analysis showed that there is a structural difference between powerful manager cooperatives and nonpowerful manager cooperatives. Powerful manager cooperatives: were less leveraged, had a more conservative financial strategy and focused on minimizing financial risk by increasing their equity/asset ratio. The overall strategy of these cooperatives increased the probability of long term competitiveness of the cooperative. The important byproduct from powerful managers maximizing their objectives was that the higher equity/asset ratio reduces the financial distress, making more resources available for international competitiveness.

The maximizing strategy of powerful managers, however, is a different strategy than that of the members. The data and the analysis illustrate that the members prefer to provide minimum capital to the cooperative. Thus, we have a dilemma where managers' behavior reduces the utility of the members but increases the total value and competitiveness of the cooperative. Given the fact that 48% of Italian cooperatives have an equity/asset ratio of less than 0.1 and that cooperative equity/asset ratios are significantly lower than the investor owned firms in Italy, the industry and the government need to find tools to encourage members to invest.

The objective of future research should focus on ways to align members' and managers' objectives to a value maximizing strategy. New generation cooperatives and trust-based relationships are of particular interest. The members' investment minimizing behavior must be understood so that incentive for strong membership and good capital structure may be developed. Ways to improve the internal bargaining process within the cooperatives also need to be studied. Lastly, policies that positively reinforce the current investment-minimizing behavior of members needs to be identified.

Appendix A

Compared to food-processing cooperatives, Italian non food-processing cooperatives had a significantly different variance and mean for the variables related to the number of members, members' profit margin and equity/asset ratio. The differences in average were expected and intuitive. Food-processing cooperatives have a more complex and costly. The additional production phases tend to lower the patronage refunds/revenues ratio mostly because of higher depreciation and higher labor costs. A large membership is necessary for

Percentage of cooperatives with powerful managers

Groups	PMC (% of coop.)	NPMC (% of coop.)	Total
Food Processing	32.39	67.61	100.0
Non Food Processing	34.55	65.45	100.0
Weighted Average	32.83	67.17	100.0

nonfood processing firms (such as farm supply or pure marketing cooperatives) to achieve the necessary economies of scale. Hence, these cooperatives usually present a larger number of members than the food processing cooperatives in the same sector. The differences in the average of the equity/asset ratio distribution are due to the different asset structure and workforce of the two types of cooperatives. Food-processing processing cooperatives usually require high capital investments to buy fixed asset that are only partially covered with equity. Then, they on average have a lower equity asset ratio, reflecting the different capital structure. The difference in the equity/asset ratio averages suggested the use of a specific dummy variable in the GLS model. Then, the segregation of the two types of cooperatives was required in the calculation of the powerful manager index, to keep separated the influence of the two explanatory variables.

The powerful manager indicators were calculated separately due to the differences in the variable distributions. The following Table reports the percentage frequencies of powerful manager cooperatives (PMCs, i.e., cooperatives where managers can impose their preference) and nonpowerful manager cooperatives (NPMCs) segregated by food processing versus nonfood processing cooperatives.

The proportion of powerful manager cooperatives was approximately the same in the two groups. The data suggest independence of the power distribution from the economic activity (a χ^2 test reported a p-value of 0.6676, which fails to reject the null hypothesis of independent variables at any reasonable significance level).

Notes

1. In fact, assuming that manager utility is evaluated by the present value of wages, the objective function of the manager may be described by the following equation: $\max\left(\sum_{t=1}^{N}(1-p)^t\frac{W}{(1+k)^t}\right)$, where W is the yearly wage, k is the appropriate discount rate and p is the probability that the cooperative goes bankrupt in that year. Assuming k is constant and W being the fixed wage, constant by definition, then the manager can maximize his or her utility only by minimizing the probability of bankruptcy (i.e., by implementing risk-minimizing strategies). In the case of fixed wages, members' returns may be considered as a constraint for the manager, who is supposed to achieve a minimum level of returns to keep his or her job.
2. Confederazione Cooperative Italiane (Confcooperative) is the most representative Italian association of cooperatives in agriculture.

3. Italian cooperative law does not require cooperatives to disclose the total value of prices and patronage refunds paid to members. In the financial statements, this value is included in the cost for raw materials and auxiliary goods.
4. Federations of cooperatives were excluded because in Italy federations are composed exclusively of cooperatives represented either by their Board or by their managers. In this case, the members-managers relationship presented characteristics significantly different from the other cooperatives.
5. In the same year, the equity/asset ratio for U.S. cooperatives ranged, depending on the industries, from 31.5% (livestock) to 70.7% (services) (USDA, 1996).
6. According to the Barton, Parcel and Featherstone's model, if the interest rate is assumed to be a non stochastic variable, the optimal solvency ratio for a cooperative is given by the formula $s = \frac{\rho \cdot \sigma_A^2}{R_A - K}$ where s is the solvency ratio, ρ is the Pratt-Arrow decreasing relative risk aversion coefficient, σ_A^2 is the variability of the return on assets, R_A is the return on assets and K is the interest rate. Similar models were developed by Collins (1985) for farmer leverage and Foster (1996) for Agribusiness firms. The formula explains the expected signs of the coefficients of prof, int, and vp9496 reported in Table 6. The expected sign for the asstr variable was stated by Titman and Wessel (1988).

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