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Staff Paper

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A Study on Italian Agricultural Cooperatives**

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Effects of Managers' Power on Capital Structure:

A Study on Italian Agricultural Cooperatives

By Carlo Russo, Dave Weatherspoon, Chris Peterson and Massimo Sabbatini¹

Abstract:

Excessive leverage is one of the most important problems facing Italian agricultural cooperatives as the international competition in the EU intensifies. An empirical study in 500 agricultural cooperatives support the hypothesis that cooperatives characterized as having “powerful managers” have a capital structure that is significantly different from the “non-powerful manager” cooperatives. Powerful manager cooperatives were characterized as having: less leverage, a focus on minimizing financial risk by increasing their equity/asset ratio, a long term strategy that increased their probability of long term international competitiveness

Introduction

The food system is rapidly evolving. Even if 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 the 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 financial leverage.

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Many Italian agricultural cooperatives are in financial distress due to excessive leverage, which reduces cooperative's efficiency by adding costs both in terms of higher transaction costs and missed profit opportunities (Manelli, 1996). Economic literature attributed the difficulties in building an efficient capital structure to various factors such as the absence of a secondary market for stocks, the high opportunity cost of money for farmers and the investment horizon of patrons (Staatz, 1989; Murray, 1983; Vitalicano, 1983). These reasons related with the capitalization problem to members' unwillingness (or inability) to provide adequate financial resources to the cooperative. Some Italian authors related the issue directly to the specific Italian cooperative regulation about the legal limits on dividends, equity shares and equity redemption (Iannello 1994, Mazzoli and Rocchi, 1996).

Empirical data confirm Italian cooperative undercapitalization. A recent survey showed that, out of a sample of 2,322 Italian agricultural cooperatives, 48% have an equity/asset ratio lower than 0.10 (source: Confcooperative). Fiorentini (1995) compared the capital structure of a sample of 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 capitalization is not exclusively an Italian issue. In the US, recent surveys show a decline in membership and patron equity level (USDA 1997). US cooperative capitalization varies among industries: the average industry debt/assets ratio ranges from .49 for cotton to .81 for poultry/livestock (Chesnik, 1997). Although this paper focuses on Italian cooperatives, the conclusions have global implications.

In this paper the factors influencing Italian cooperatives' capital structure were analyzed using the coalition theoretical framework (Staatz, 1983). An empirical test provided evidence of the framework's conclusions utilizing a new dataset about Italian cooperatives. The study hypothesis is that the distribution of the bargaining power among the coalition's group influenced the actual leverage level of the cooperative. 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.

The Model and the Data

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. 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 within the groups are high enough, the adoption of Pareto - inefficient strategies are 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 strategy of the cooperative 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 focuses on the evaluation of the effects of the bargaining power of managers. According to the general formulation of the principal-agent model, if members were not able to monitor (and enforce), managers have the incentive to behave opportunistically by maximizing their own utility instead of the members'. Since Italian cooperative managers usually were compensated on fixed wages not based on performance, they are expected to support risk-minimizing strategies rather than members' return maximizing ones. Then, the hypothesis is that, when managers effectively influence the capital structure through their bargaining power, the expected average equity/asset ratio would be higher, more sensitive to risk and less sensitive to the cooperative profitability and cost of financing.

The hypothesis testing was performed on a data set provided by the Confederazione Cooperative Italiane² 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

² Confederazione Cooperative Italiane (Confcooperative) is the most representative Italian association of cooperatives in agriculture.

of detailed information about the value of patronage refunds³. Also, the federations of cooperatives were excluded from the sample because of their peculiar characteristics⁴.

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 of effectively influence the strategies by imposing his/her preferences on the other groups within the cooperative).

In order to identify cooperatives characterized by effective manager's power, indicators were developed based on three assumptions:

1. Powerful managers can transfer costs from the cooperative to members. Managers have the incentive to keep resources within the cooperative, where they could control them. Powerful managers reduce the resource transfer to members both in terms of profits and patronage.
2. Managers' power is directly related to the number of members. Due to negotiations among groups of members, transaction costs increase as the number of patrons rise, hence the managers become more powerful.
3. Managers' power is inversely correlated to members' participation in the cooperative management. This relationship is due to the fact that members' participation may reduce managers' power and because a strong manager may discourage members' participation.

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.

Given these assumptions, an index of effective manager bargaining power was developed, based on four indicators. Table 2 reports the definition of the indicators and shows the absence of significant linear correlation with the equity/asset ratio. All data refer to fiscal year 1995.

Table 2: 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	$\frac{pr_i + rm_i}{revenues_i}$ <p>pr_i= patronage refunds rm_i= price paid for members' products</p>	negative	-0.1395
PC _i	percentage of revenues retained by the cooperative	$\frac{NIAT_i + Dep_i + \sum app_{i,n}}{revenues_i}$ <p>NIAT= net income after taxes dep = depreciation app = year's fund appropriations</p>	positive	0.1197
LM _i	natural logarithm of the number of members	$ln(n. \text{ of members})$	positive	0.3629
PM _i	percentage of members attending annual meeting	N/A	negative	-0.2531

⁴ The exclusion of federations of cooperatives was due to the fact that in Italy federations are composed exclusively by cooperatives represented either by their Board or by their managers. Then, the members-managers relationship presented characteristics significantly different from the others cooperatives.

The indicators were aggregated into a overall power index (PW_i) calculated for each cooperative 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:

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

Where j denotes value-added versus non value-added cooperatives;

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), while a negative PW_i implies its absence (Non Powerful Manager Cooperatives or NPMC). Given the theoretical framework, PMC were expected to pursue the maximization of managers' utility, while NPMC were assumed to pursue members' utility maximization.

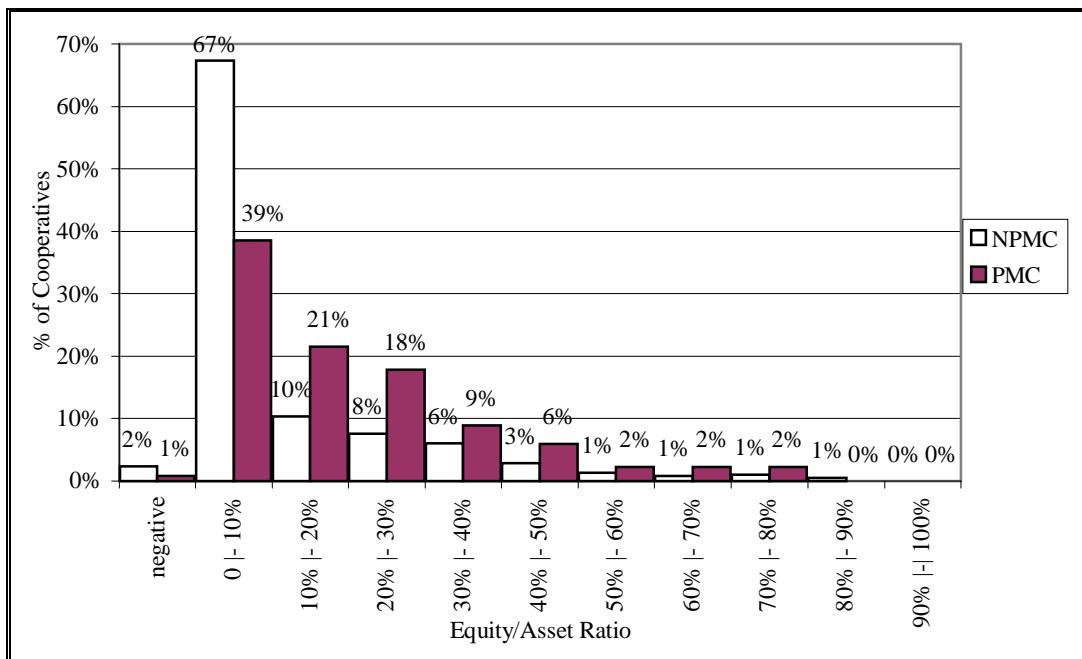
Table 4 compares and contrasts the identified PMCs with the NPMCs (all data refer to fiscal year 1995). The table showed that, on average, PMCs were financially larger in terms of revenues, equity and total assets.

Table 3 : Descriptive Statistics for PMCs versus NPMCs (dollar 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

Data source: Confcooperative

Figure 1: Distribution of the Equity/Asset Ratio for PMCs and NPMCs



Data source: Confcooperative

Figure 1 describes the difference in the distribution of the equity/asset ratio. The graph shows that the 69% of the NPMC have an equity/asset ratio lower than 0.1 vs. the 40% of PMC. The average NPMC equity/asset ratio was 0.10 vs. 0.19 of PMCs.⁵ A t-test under the assumption of unequal variance comparing the equity/asset ratios showed that the two sub-sample averages were significantly different (1% significance level). The test provides first empirical evidence of the incidence of power distribution among groups on the capital structure: on average PMCs are significantly less leveraged than NPMCs. The empirical results support the theoretical framework and hypothesis.

The significant difference in leverage level implied different capitalization strategies. To investigate these differences further, the determinants of cooperative capital structure both for PMCs and NPMCs are analyzed in the following section using an econometric model.

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.

The regression utilizes some of the explanatory variables proposed by Barton, Parcell and Featherstone (1996) for the determination of the optimal cooperative capital structure.

⁵ In the same year, the equity/asset ratio for US cooperatives ranged, depending on the industries, from 31.5% (livestock) to 70.7% (services). (USDA 1996)

The dependent variable was the equity/asset ratio. Unlike the Barton, Parcell and Featherstone model, the variance of the interest rate was not included in this analysis.⁶ In order to adapt the model to the Italian context, the fixed assets/total asset ratio and a dummy variable identifying the value added cooperatives were added. Hence, the investment structure and the activity of the cooperative become endogenous variables in the model. Finally, a dummy variable identifying PMC was added, in order to test the study hypothesis. The explanatory variables are described in table 4 and, unless specified, all values refer to fiscal year 1995.

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 relative continuous variable due to the presence of powerful managers. Thus, a decrease in the profitability or in the interest rate was expected to have less impact in PMCs because managers, concerned about risk, would use their power to limit the use of debts. Conversely, an increase in the performance or

⁶ According to the Barton, Parcell 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 $s = \frac{\tilde{n} \cdot \rho_A^2}{R_A - K}$ 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).

operational risk was expected to have a greater impact on PMCs, given the risk minimizing preferences of the managers.

Table 4: Explanatory Variables of the GLS Model

Variable	Description	Definition	Expected sign
prof _i	A proxy for cooperative profitability.	$\frac{pr_i + rm_i + NIAT_i + dep_i + \sum app_{n,i}}{revenues_i}$ 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 value added cooperative	$valadd_i = \begin{cases} 1 & \text{value added coop} \\ 0 & \text{otherwise} \end{cases}$	negative
pm _i	A dummy variable for powerful manager cooperatives	$pm_i = \begin{cases} 1 & \forall PW_i > 0 \\ 0 & \text{otherwise} \end{cases}$	positive
pm _i * prof _i	instrumental variables evaluating the effect of powerful managers on the continuous variable coefficient	$= prof, int, asstr \text{ or } vp9496$ $\forall pm = 1$ $= 0 \quad \forall pm = 0$	negative
pm _i * int _i			negative
pm _i * asstr _i			positive
pm _i * vp9496 _i			positive

Results.

The model was estimated using the GLS approach to correct for heteroskedasticity which was indicated by the Breusch Pagan test (significant at 1% level). The results of the equity/asset ratio regression model are shown in table 5.

Table 5: Equity/Asset Ratio GLS Regression Results

Variable	Coefficient	t-Stat
intcecept	-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

The signs of the continuous variable coefficients coincided with the expectations outlined in table 4. The only exception was vp9496, which was negative but not significant at 10% level. Later in the paper, this result is explained when a comparison is made between NPMCs and PMCs. The coefficient sign of dummy variable pm_i presented a positive sign which was contrary to the expectation. However, the associated t-statistic showed that the coefficient was not significant at 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. 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 a high profitability may make members more willing to invest in that cooperative.

The model supports the hypothesis of structural change: 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 (pm_i) and its cross-products was significant at the 1% level. The 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 presented significant difference in all slope coefficients except profitability, which means that these cooperatives reacted to changes in their environment by adopting different capital structure strategies. In particular, the results stressed 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 instrumental variables' coefficients are consistent with the expectations, except for the cross product between the variables (pm_i) and ($prof_i$) which is positive but not significant.

The estimation of the two separate regression equations provided more detailed insight into the differences in the determinants of the capital structure between PMCs and NPMCs:

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

$$(E/A)_i = -0.05 + 0.16 \text{ prof}_i + 0.90 \text{ intex}_i + 0.30 \text{ vp9496}_i + 0.48 \text{ asst}_i - 0.04 \text{ valadd}_i$$

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):

$$(E/A)_i = -0.01 + 0.09 \text{ prof}_i + 1.88 \text{ intex}_i - 0.11 \text{ vp9496}_i + 0.32 \text{ asst}_i - 0.07 \text{ valadd}_i$$

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 more significant coefficients of profitability (prof), asset structure index (asst), and interest rate (intex). In addition, the two types of cooperatives reacted differently to an increase in the variability of profitability (vp9496): on average, PMCs were expected to increase equity, while NPMCs reduced it. Both NPMC and PMC react to an increase in the asset structure ratio by increasing equity, even if the latter showed a higher sensitivity. Changing the interest rate (*coeteris paribus*) was expected to have a significant influence on the capital structure of NPMC, 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. Instead, powerful managers, being more concerned about risk than profitability, may be less willing to reduce equity even if the interest rate on debt decreases. 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.

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 non-powerful manager cooperatives. Powerful manager cooperatives: were less leveraged, had 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 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 less than .1 and that cooperative equity/asset ratios are significantly lower than the investor owned firms in Italy, the industry and the government needs to find tools to encourage members to invest.

The objective of future research should focus on ways to align the membership's objectives and the managers' objectives to a value maximizing strategy. New generation cooperatives and trust-based relationship are of particular interest. The members' investment minimizing behavior must be understood so that the fundamental structure of the cooperatives has an incentive for strong membership and good capital structure. Improving the cooperative internal bargaining process among groups also needs to be analyzed. Lastly, policies that positively reinforce the current investment-minimizing behavior of members need to be addressed.

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