Manager Power, Member Behavior and Capital Structure: Portuguese Douro Wine Cooperatives

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Abstract

Leverage is one of the most important financial factors to the survival and viability of agricultural cooperatives (e.g., wine cooperatives) during a period of intense competition. Leverage is influenced both by the behavior of managers and cooperative members. An empirical study for the Douro Demarcated Region Wine Cooperatives (DDR-WC) supports the hypothesis that managers have a positive influence in the determination of the equity/total assets ratio and that individualistic behavior of cooperative members has a negative influence in the value of this ratio. This paper suggests that there may be value in reconsidering cooperatives in the context of a so-called Mediterranean model.

Keywords: *Agricultural cooperatives, governance, behavior and leverage*

Introduction

Not unlike their counterparts in the United States, Northern Europe, Australia and New Zealand, Portuguese cooperatives are legally organized following a traditional cooperative structure with open membership, democratic control, restricted residual claims, and benefits to members proportional to patronage. But there are fundamental behavioral differences in Portuguese cooperatives that appear to be rooted in socio-economic factors. This observation is particularly true in the oldest, most important wine production region of Portugal, the Douro Demarcated Region (DDR). There, the wine cooperatives (DDR-WC) appear to follow a so-called "Mediterranean model" that has either no full-time professional manager or a weak manager. Interestingly, this model is also the norm in Brazil (possibly most of South America), where the lack of managerial leadership is the Achilles heel of effective cooperative behavior (personal communication with Fabio Chaddad, June 2004).

Like many agricultural cooperatives, the DDR-WC increasingly face survival challenges related to financial issues. Factors such as member equity capital acquisition and redemption are well-known constraints on growth and sustainability that arise from ill-defined property rights in the cooperative environment (Cook and Iliopoulos 2001). This ubiquitous problem, however, may be more complicated in countries like Portugal, where strong managerial leadership often is lacking. Superficially at least, manager power appears to be fundamental to optimal cooperative capitalization, though there has been limited empirical research on the role of property rights and managerial behavior

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on the economic performance of agricultural cooperatives (Cook, 1994). We suspect the limited empirical attention to this matter stems in part from the fact that the Mediterranean model is not widely appropriate.

This paper provides an empirical examination of property rights, specifically the behavior of members and managerial behavior, on the economic performance of DDR-WC. We use a coalition-theoretic structure (Staatz, 1983). Following Russo et al. (2000) and Chaddad and Cook (2002), we analyze the effects of member behavior and the power, meaning influence or control, that managers have over the capital structure of DDR-WC. The results of this analysis lead us to posit that cooperative research might benefit from distinguishing the Mediterranean model from cooperative models that are more appropriate in much of the world.

The remainder of this paper consists of four sections. Section 2 provides the background of the DDR-WC. The conceptual framework is presented in Section 3. Here we develop the framework to examine the hypothesis that the financial structure of DDR-WC is profoundly influenced by the characteristics of the property rights attached to the cooperatives and, consequently, cooperative governance (Williamson, 1996). Section 3 begins with a brief overview of salient literature before discussing the model and data. Results are presented in Section 4. Some general conclusions are drawn in the fifth and final section.

Wine Cooperatives in Douro Demarcated Region

The DDR is situated in northeastern Portugal, on the steep banks of the Douro River. It is the most important wine-production region in Portugal, representing about 20% of the national production and about half of the value, mainly due to the more valuable Porto wine sales (Rebelo, 2001). Total annual DDR wine production averaged 1,282,676 hectoliters in the 1990s (47% table wine and 53% Porto). WC produce a greater percentage of table wines, accounting for 58% of total DDR table wine production, while WC Porto wines account for 38% of DDR Porto production.

The unique need for and challenges facing DDR-WC are evident from a combination of demographic and socio-economic data. Vineyards cover almost 1/3 of the total usable land in the Douro region, most of which is owned by small farms. There are 38,588 ha of vineyards on 85,000 parcels owned by 33,000 small wine producers. Each of these small producers owns an average of l.17 ha, making cooperation a vital element to their economic well being. Twenty-two wine cooperatives represent roughly 16,000 small growers.

Effective cooperation and cooperative performance are challenged by a variety of highly unusual cooperative characteristics. DDR-WC have large memberships, averaging 723 members (286 to 2056 members). This alone dramatically increases transaction costs associated with cooperative decision making. Furthermore, only twelve of the 22 cooperatives have a full-time manager or director; the largest one has both. Wine production per member typically is quite limited. 58% of all cooperative members produce 10 or fewer barrels of wine (550 liters per barrel); 82% of the members produce fewer than 20 barrels. Inability of members to make informed decisions concerning cooperative finance is further complicated by two additional factors. First, the level of formal education is limited for most WC members; 85% of the 2056 members have less than 4 years of education. Second, the WC are likely to have short planning horizons because

sixty-one percent of the members are at least 50 years old. All of these characteristics militate against optimal cooperative performance, especially capital accumulation and retained earnings for growth. Nevertheless, DDR-WC grew throughout the 1990s, consistent with that of the Portuguese economy. Total assets increased 46%; fixed assets increased 180%; members increasingly supported investment; and cash-flow/gross revenues increased, indicating additional retained funds. Overall leverage and financial structure improved. See Table 1.

The apparent contradiction between DDR-WC growth and the socio-economic profile of members might be explained, in part, by testable propositions about the expected behavior of members and managers. Whether or not the cooperative performance benefited from a fulltime manger or director is unclear and is a centrepiece of this study. This is accomplished in the next section, which presents a conceptual framework based on new institutional economics and coalition theory.

Conceptual Framework

Work in the theory of the cooperative firm suggests the presence of transaction costs within this traditional structure (Vitaliano, 1983 and Staatz, 1987). These transaction costs are generated by a set of vaguely defined property rights constraints originating from the structure of traditional cooperatives and leading to conflicts over residual claims and decision control. The five vaguely defined property rights constraints are the free-rider, horizon, portfolio, control and influence costs problems (Cook, 1995). Simply put, property rights within the traditional cooperative structure do not provide members with the necessary incentives to make optimal investment decisions (Cook and Iliopoulos, 2001). The socio-economic profile of Douro wine cooperative members described in the previous section—large number of small farms, and relatively uneducated, older members—lend further support to the argument that members have limited incentives to invest in the cooperative.

In addition to investment constraints, ill-defined property rights generate collective decision-making problems in traditional cooperatives, namely, the control and influence costs problems. The control problem is similar in nature to the shareholder-manager problem in investor-owned firms (IOF), but is amplified by the lack of external competitive market pressures (e.g., equity markets and the market for corporate control) that help discipline IOF managers. Influence costs are inherent to all organizations where decisions affect wealth distribution among stakeholders. In addition to influence activities among employees and managers, cooperative members may also attempt to influence the decision-making process. Influence costs are greater when there are different interests among group members and when the potential gains are great.

According to coalition theory, the cooperative consists of many groups with different objectives. Each attempts to maximize their own individual utility, often at expense of other groups. This situation is particularly relevant to agricultural cooperatives because costs and benefits can be allocated among groups according to a variety of rules (Zusman, 1982). The coalition decides which groups will benefit and which will bear the cost of operations by setting prices for member products, offering specific services, and choosing capitalization strategies. In this context, sufficiently high transaction costs within the groups may promote Pareto inefficient strategies. In fact, if transaction costs are higher than the increase in value resulting from the efficient strategy, groups have

Table 1. Financial indicators (annual averages), nominal prices in euros

	1990	1991	1992	1993	1994	1995	1996	1997	1998
Total assets (€)	4,357,074	4,448,863	4,331,516	4,270,289	4,439,695	5,221,686	6,046,912	6,179,976	6,366,841
Fixed assets, net depreciation (€)	646,322	744,750	854,476	1,004,759	1,115,971	1,273,985	1,382,797	1,372,313	1,807,240
Working capital (€)	3,710,752	3,704,113	3,477,040	3,265,530	3,323,725	3,947,701	4,664,114	4,807,664	4,559,601
Equity/Total assets	0.21	0.21	0.24	0.26	0.31	0.28	0.26	0.28	0.35
(Equity + debts to members)/Total assets	0.49	0.55	0.57	0.53	0.58	0.57	0.55	0.53	0.56
Gross revenue (€)	3,045,944	2,901,117	2,260,614	1,783,284	2,343,002	2,973,182	3,453913	3,466,226	3,245,650
Value of grapes-patronage refund (€)	2,289,331	1,898,742	1,181,509	1,228,583	1,684,389	2,016,119	2,725,603	2,183,803	1,834,563
Patronage refunds/Gross revenue	0.75	0.65	0.52	0.69	0.72	0.68	0.79	0.62	0.57
Cash-flow/Gross Revenue	0.03	0.04	0.08	0.07	0.07	0.06	0.05	0.07	0.08
Price of grapes (€/Kg)									
-Grapes for Porto wine	0.753	0.678	0.663	0.763	0.888	0.938	0.968	1.057	1.142
-Grapes for table wine	0.185	0.175	0.195	0.294	0.384	0.379	0.294	0.424	0.554
Value of Port wine grapes/Value of grapes	0.687	0.661	0.545	0.702	0.710	0.710	0.705	0.601	0.873

no incentive to negotiate an efficient solution based on the compensation principle. As a consequence, cooperative strategies will not be determined solely by the efficiency principle, but also by the initial distribution of resources and power among coalition groups, cooperative members and the manager.

Fama (1980) Fama and Jensen (1983a and 1983b) arrive at this conclusion from an agency theoretic perspective. Managers act as agents of the principal (members) and attempt to optimize the value of their pecuniary and non-pecuniary rewards. However, management behavior implied by agent utility maximization allows for departures from profit maximization or member return optimization in IOF and cooperatives.

Clearly, the sheer size and socio-economic profile of DDR-WC complicate what is a generally difficult managerial environment for cooperatives. Whereas mangers and executive leadership are ordinarily presumed vital to the economic performance of a cooperative, it is at best unclear whether DDR-WC performance benefited from or changed due to a full-time manger or director. The manager's task is likely to be far more formidable than in more traditional cooperatives exemplified throughout the cooperative literature. In fact, the presumption that a manager has substantial discretionary power in setting cooperative strategies and policies may not fit the Mediterranean model.

The DDR-WC context is nearly ideal for testing this hypothesis. Not only is the number of cooperatives with a full-time hired manager/director approximately equal to those without one (12 versus 10), all 22 DDR-WC have similar socio-economic profiles. Furthermore, DDR-WC managers are compensated on fixed wages, not performance. This fact means one would expect the hired managers to pursue risk minimizing strategies rather than returns to members. Accordingly, it is hypothesized that when DDR-WC managers effectively influence the capital structure through their bargaining power, the expected average equity/asset ratio would be higher than found in cooperatives lacking a hired manager. The capital structure would also be more sensitive to risk and less sensitive to the profitability and the cost of financing (Russo et al., 2000).

Hypothesis: A strong DDR-WC manager will advance risk minimizing strategies rather than returns to members.

- The equity/asset ratio will be higher than in cooperatives lacking a hired manager.
- The capital structure will be more sensitive to risk and less sensitive to the profitability and the cost of financing.

To test this hypothesis concerning manager power, member behavior, and capital structure, we follow Russo et al. (2000). Nine years of financial data (1990-1998) were obtained from the 22 DDR-WC, yielding a total of 198 observations. The data were collected from financial statements of each cooperative. These data were then, applied to an equity/asset regression model to assess, among other things, the role of manager power and member behavior on DDR-WC capital structure.

Methods and Results

Following Russo et al. (2000), the capital structure of DDR-WC is modeled as a function of cooperative profitability, the cost of debt financing, the weight of fixed assets relative to total assets, a measure of manager's power, and the way members par-

ticipate in the cooperative. We also introduce an annual trend to track structural changes, like technological progress. We begin the description of this model by first defining two indicator variables that capture manager's power and behavior of members.

Manager's power

Russo et al. (2000) developed a quantitative measure of manager power, i.e., the ability of effectively influence capitalization strategies by imposing capital retention preferences on the cooperative. We apply that measure to DDR-WC, though data limitations prohibit considering one of the elements—member participation in cooperative management.

Strong managers are expected to reduce resource transfer to members, both in terms of profits and patronage. Two indicators of manager strength are defined in this study. The first indicator is the percentage of annual revenues transferred to patrons/members (PP_i),which is measured as patronage refund (PR_i) divided by gross revenues (R_i); $PP_i = PR_i/R_i$. The second indicator is the percentage of annual revenues retained (PC_i), which is measured as retained net income after taxes ($NIAT_i$) plus depreciation (Dep_i), all divided by gross revenues; $PC_i = (NIAT_i + Dep_i)/R_i$. In accordance with theory, one would expect PP_i to be negatively correlated to leverage (measured as the ratio of equity to assets), while PC_i would be positively correlated to leverage. Based on 198 observations of DDR-WC, the calculated correlation between each index and leverage is shown in the final column to conform to *a priori* sign expectations.

Table 2. Correlation between manager power indicators and leverage

Manager power indicators	Description	Expected correlation between manager power indicators and leverage	Correlation with equity/asset ratio [1]
PP_i	Percentage of annual revenues transferred to patrons/members	Negative	-0.0475
PC_i	Percentage of annual revenues retained by the cooperative	Positive	0.410

[1] Computed for the 198 observations (9 years x 22 DDR-WC).

A manager power index (MPI_i) is constructed for each of the i cooperatives. That index is the sum of two indicator variables that are functions of PP_i and PC_i.

$$MPI_i = f(-PP_i) + f(PC_i) \tag{1}$$

The function f is defined as:

$$f(x_{ij}) = \begin{cases} 1 & \forall x_{ij} > \overline{x}_j + \sigma_j \\ 0 & \forall \overline{x}_j - \sigma_j \le x_{ij} \le \overline{x}_j + \sigma_j \\ -1 & \forall x_{ij} < \overline{x}_j - \sigma_j \end{cases} \tag{2}$$

where: x_{ij} is the value of the two variables (PP_i and PC_i) for the i^{th} cooperative; $\bar{x}_j$ is the sample mean of variable j; and σ_j represents the sample standard deviation.

$MPI_i \in [-2 \text{ to } +2]$. Since managerial agents are expected to first maximize their own utility, and then, members' utility, a positive value denotes "strong" management, while a negative value implies "weak" management. The null value indicates a neutral or balanced distribution between these two objectives.

The manager power indicator findings are summarized in Table 3 for all DDR-WC, over the nine-year study period. The majority of the DDR-WC (79%) exhibited neutral or balanced managerial power over most of the nine years. This finding is consistent with the fact that most WC are patronized by small farmers and managed on a voluntary basis by a board of directors (Rebelo et al., 2002). Interestingly, several of the average values for strong managers are well below their neutral- or weak-manager counterparts. Only average cash flow and average equity are greatest for the strong manager category. Consistent with prior expectations, the least leveraged WC are managed by strong managers. This observation is evident by comparing the average equity/assets ratio, which is 0.36, 0.23 and 0.24 for strong, neutral and weak, respectively.

Table 3. Descriptive statistics for manager power index (euro values in millions)

	Strong $MPI_i > 0$	**Neutral $MPI_i = 0$**	**Weak $MPI_i < 0$**	**Total sample**
Number of observations	22	157	19	198
Average revenues	1.84	3.09	3.45	2.83
Average value of grapes	0.99	2.01	1.90	1.89
Average cash flow	0.31	0.13	-0.003	0.13
Average equity	1.46	1.24	0.88	1.23
Average total assets	4.07	5.39	3.59	5.07

Source: Financial statements of DDR-WC

The MPI_i index is subsequently redefined as a zero-one indicator variable, i.e, manager power index indicator ($MPII_i$) for use in the equity/asset regression model. $MPII_i = 1$ if $MPI_i > 0$ (strong manager), otherwise $MPII_i = 0$ (weak manager).

Behavior of members

To evaluate the potential effects of member behavior on DDR-WC financial structure, we surveyed the chairmen of the WC boards of directors. This survey took place in 1998/1999, using face-to-face interview techniques. For more details see Rebelo et al (2002). Each was asked:

> *Do the members behave individualistically, viewing the cooperative simply as buyer of their products and "leaving" the cooperative when it experiences difficulties, namely in low production years?*

The answers were used to construct an indicator variable that is related to the way individual members behave, i.e., exercise their property rights in the cooperative. Define the indicator variable for individualistic behavior of members (IB), as IB = 1 if the answer is yes, i.e., members are perceived to vote according to individual interests rather than cooperative interests, zero otherwise. Individualistic behavior is expected to have a negative influence on capital structure. Like MPII, this dichotomous variable was incorporated as an explanatory variable in equity/asset regression model.

The equity/asset regression model

Specification of the equity/asset model is given in Table 4. The equity asset ratio is specified as a linear function of the five exogenous variables described in Table 4, along with expected parameter signs.

Table 4. Exogenous variables of the equity/asset model

Variable	Description	Definition	Expected sign
Prof	A proxy for cooperative profitability	(PR+NIAT +Dep)/R	Positive, null
Int	A proxy the cost of debt financing	Intex/(TA-Equity) Intex = Interest expenses TA = Total assets	Positive, null
FATA	The ratio between fixed assets and total assets	Fixed assets/TA	Positive
MPII	An indicator variable for the power of manager cooperative	MPII =1, if MPI > 0 MPII =0 if MPI ≤ 0	Positive
IB	An indicator variable of member behavior	IB =1 if the behaves individualistically IB = 0, otherwise	Negative
T	A annual trend variable to reflect structural changes	T = 1, . . . , 9	Positive, null, or negative

The model was estimated using generalized least squares (GLS). Both random and fixed effects models were rejected despite presence of panel data. Heteroskedasticity was detected with a White test (5% significance level) and corrected for using the Newey-West method. Statistical results are given in Table 5. All signs of estimated coefficients coincide with the expectations given in Table 4.

A significant temporal trend due to unknown structural factors was found. The equity asset ratio increased at a rate of 1.1% per year during the 1990s. The average equity/asset ratio is not sensitive to the profitability (Prof) and cost financing (Int); regression coefficients on these variables are not statistically significant. This result is consistent with Portugal joining the European Community in 1986. DDR-WC could invest in new technology to improve vinification and to vertically integrate into bottling, financed by European Agricultural Guidance and Guarantee Funds-Guidance (EAGGF-G). The

resulting 60% capital subsidy reduced leverage needs. The most interesting statistical result is that manager's power (MPII) and member behavior (IB) are both significant and conflicting determinants of cooperative capital structure. The positive sign on FATA indicates that managers, generally strive to reduce risk-induced operating leverage. However, there is also statistical evidence of a small positive influence of manager's power in the determination of the equity/asset ratio, which is at least partially offset by members acting more out of self-interest than collective interest in the cooperative.

Table 5. Equity/asset ratio GLS regression results

Variable	Coefficient	t-statistic
Intercept	0.177*	8.313
T	0.011*	3.188
Prof	0.006	0.595
Int	-0.090	0.559
FATA	0.207*	2.446
MPII	0.082*	2.710
IB	-0.047*	-3.746
GLS weighted R^2	0.284	
F-statistic	12.62*	
Durbin-Watson statistic	1.815	

* Significant at 5% level

Conclusions and Further Research

Like many other agricultural cooperatives, DDR-WC increasingly face survival challenges related primarily to financial issues linked to acquiring and redeeming member equity capital and manager's power, both of which can be constraints on growth and sustainability. The objective of this paper was to analyze the effects of member behavior and the power that managers have over the capital structure of DDR-WC. As expected, the results of the model show that during the 1990s: (1) managers, in general, had a positive but relative anemic influence in the determination of the equity asset ratio (capital structure), (2) the individualistic behavior of cooperative members had a negative influence in the value of this ratio. These results show that in the pursuit of selfish interests, the different goals of DDR-WC members and managers have adverse consequences on the capital structure/leverage of the cooperative. DDR-WC have much to gain if these conflicting goals could promote a common vision. By striving to achieve the same goals, DDR-WC may increase overall efficiency, which is essential to economic success in the increasingly competitive world wine market.

The traditional cooperative model adopted by DDR-WC may not be adequate for developing the commonality of goals needed in an increasingly competitive market environment, where risk-taking and extensive investments in new products are part of the

decision-making process. New Generation Cooperatives (Cook and Iliopoulos, 1999) may be essential to solve the conflicts over residual claims and decision control. However, special consideration should be given to the development of a so-called Mediterranean model of new generation cooperative that addresses the unusual socio-economic structure of cooperatives comprised of many small farms with relatively uneducated, older members. This context poses special challenges to optimal capital formation. Two issues are of particular importance in this context are: (1) developing a better understanding of member investment minimizing behavior, including the degree of membership heterogeneity; and (2) improving the cooperative internal bargaining process among heterogeneous stakeholders with competing interests (members and managers).

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