

**MANAGER POWER, MEMBER BEHAVIOR AND CAPITAL STRUCTURE:  
PORTUGUESE DOURO WINE CO-OPERATIVES**

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## **Poder dos Gestores, Comportamento dos Sócios e Estrutura de Capital: As Cooperativas Vitivinícolas do Douro - Portugal**

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### **Resumo**

O endividamento é um elemento financeiro relevante para a sobrevivência e viabilidade das cooperativas agrícolas (e.g., cooperativas vitivinícolas), num período de grande competitividade. A estrutura de capitais é fortemente influenciada pelo comportamento dos gestores pelo dos sócios das cooperativas agrícolas. O estudo empírico sobre as cooperativas vitivinícolas da Região Demarcada do Douro (DDR-WCs) suporta a hipótese de que os gestores têm uma influência positiva na determinação do rácio capital próprio/activo total, enquanto o comportamento dos associados influencia negativamente o valor deste rácio.

## **Manager Power, Member Behavior and Capital Structure: Portuguese Douro Wine Co-operatives**

**João Rebelo<sup>\*</sup>, José Vaz Caldas<sup>?</sup> and Scott C. Matulich<sup>\*\*</sup>**

### **Abstract**

Leverage is one of the most important financial factors to the survival and viability of agricultural co-operatives (e.g. wine co-operatives) in a period of intensified competition. The leverage is strongly influenced by the behavior of managers and agricultural co-operative members. An empirical study for the Douro Demarcated Region Wine Co-operatives (DDR-WCs), supports the hypothesis that managers have a positive influence in the determination of the equity/total assets ratio and that the individualistic behavior of co-operative members has a negative influence in the value of this ratio.

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# **Manager Power, Member Behavior and Capital Structure: Portuguese Douro Wine Co-operatives**

## **Abstract**

Leverage is one of the most important financial factors to the survival and viability of agricultural co-operatives (e.g. wine co-operatives) in a period of intensified competition. The leverage is strongly influenced by the behavior of managers and agricultural co-operative members. An empirical study for the Douro Demarcated Region Wine Co-operatives (DDR-WCs), supports the hypothesis that managers have a positive influence in the determination of the equity/total assets ratio and that the individualistic behavior of co-operative members has a negative influence in the value of this ratio

## **1. Introduction**

The agri-food system is increasingly characterized by a demand for greater co-ordination between participants, at every level. Demand for extra-sensory attributes by consumers, realization of more efficient processing from using more consistent inputs, and the increasing trait specialization of agricultural products all point toward great control and co-ordination, being co-operatives a prominent organizational form in the world agri-food system. “In Europe, co-operatives in most countries control market shares often exceeding 50 percent in numerous agri-food categories. In the United States, co-operatives market 32 percent of the commodities and products produced and processed in the agri-food chain – equivalent to more than US\$100 billion annually” (Cook and Iliopoulos, 2001: 335).

In Portugal, the organizational and legal form of co-operative continues to constitute the most practical and common alternative of achieving such vertical co-ordination of the production, processing and marketing for the wine growers<sup>2</sup>. Despite the existence of market niches, several economic factors explain why most wine producers choose co-operatives to vertically integrate, namely (1) the mature phase that presently characterizes the wine

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<sup>2</sup> In Portugal, co-operatives play an important role in the agri-chains of milk, wine, fruit and vegetables (Rebelo, et al., 2002).

industry<sup>3</sup> and (2) the impossibility, due their reduced dimension (size), to vertically integrate their activities.

The 115 Portuguese Wine Co-operatives (WCs) provide, on average, 50% of the total Portuguese wine production; almost all have their origins in the 1950s and 1960s and were created with substantial technical and financial support from the government (Teixeira, 2001). At that time, financial support given to the creation of these organizations was justified in terms of: the need to reduce wine production costs by capturing economies of scale, increase the quality of production, solve problems of stocking, and obtain by-products. All were expected to increase co-operative member income. That is, given the prevailing economic environment at that time, public entities considered WCs as the most appropriate form of commercial organization to reduce or eliminate market failures (namely, market power/monopsony and asymmetric information).

Wine grapes are produced and vinified throughout Portugal in legally demarcated regions<sup>4</sup>. The most important and oldest demarcated region is the Demarcated Douro Region (DDR). In this region, most of the 23 wine co-operatives (DDR-WCs) were formed during the 1950s and 1960s<sup>5</sup> to perform vinification operations and to stock the wines (table and Porto) produced. However, bottling operations were not performed because wines were sold primarily in bulk. The nature of WCs changed in the nineties. European Union (EU) funds enabled most WCs to invest in improved vinification and to vertically integrate into bottling.

Following the application of Portuguese co-operative laws the DDR-WCs are managed using traditional co-operative principles, namely: democratic voting by members; open membership; patron equity; limited equity ownership share by individual patron; net income is distributed to patrons as patronage refund on a cost basis; return on capital is limited; and ideological and political neutrality. Like many other agricultural co-operatives, the DDR-WCs increasingly face survival challenges related primarily to financial issues linked with acquiring and redeeming member equity capital and with manager's power.

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<sup>3</sup> This phase is expressed by: (1) price and risk augmenting deregulation, (2) accelerated vertical rationalization, and (3) increased capital factor intensity, with the consequent low rate of profitability and the reduced search by private firms to enter the sector. This increased need for equity in an industry with a low rate of earnings complicates co-operative growth plans.

<sup>4</sup> Vines cover almost 6.5% of Portugal's agricultural area. During the 1993-98 period, wine production represented 16.8% of Gross Agricultural Product, on average, and of all the Portuguese crops, grapes for wine-making are by far the most valuable (Rebelo et al, 2002).

<sup>5</sup> One co-operative in the DDR started during the nineties (1995).

These factors are constraints on growth and sustainability that arise from ill-defined property rights in the cooperative environment (Cook and Iliopoulos 2001).

This theoretical explanation for less than optimal co-operative capitalization is well established. But there has been limited empirical research on the role of property rights and managerial behavior on the economic performance of agricultural co-operatives (Cook, 1994). This paper provides an empirical examination of property rights, specifically the behavior of members, and managerial behavior on the economic performance of DDR-WCs. Using the coalition-theoretic structure (Staatz, 1983) and following Russo et al. (1999) and Chaddad and Cook (2002), we analyze the effects of member behavior and the power that managers have over the capital structure of DDR-WCs.

The remainder of this paper consists of four sections. Section 2 provides the background of the DDR-WCs, focusing on the dramatic change in the financial structure of these cooperatives during the 1990s. The conceptual framework is presented in Section 3. Here we develop the framework to examine the hypothesis that the financial structure of DDR-WCs is profoundly influenced by the characteristics of the property rights attached to them and, consequently, by co-operative 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.

## **2. Wine Co-operatives in Douro Demarcated Region**

Although Portugal is a small country (3,700,161 ha of usable, agricultural land and 381,794 farms), climatic and topographic conditions vary widely, resulting in diverse agricultural activities spread across the different regions of the country. Among these regions is the relatively homogenous agricultural region called Douro. The Douro region is situated in the northeastern Portugal, on the banks of the Douro River, and includes most of the oldest wine demarcated region<sup>6</sup>, known for the production of the Port wine. This zone, using the EU classification, is included in the category of High Nature Value farming systems, where “in place of sustainable and relatively labor-intensive grazing regimes and the maintenance of features such as terracing and stock-proof walls, economic conditions lead to the land being under-managed” (European Commission, DG VI, 1997: 20).

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<sup>6</sup> The DDR was established and regulated by a royal diploma, during the kingdom of Joseph I of Portugal, in 1756. Due the importance and value of its natural, cultural and scenic heritage, a part of the DDR presented itself as candidate, in the year 2000, to be admitted in the “List of the World Heritage of UNESCO, as Cultural, Living and Evolving Landscape.”

Wine is the most important regional product covering almost 1/3 of the total usable land. Approximately 78% of the DDR wines are grown on steep hills where mechanization is very difficult to undertake (FRAH, 2000). As FRAH points out,

*...the scenery in the Douro and its way of life are typically Mediterranean. Its climate and geo-morphological nature makes human settlement difficult, however vineyards and olive and almond groves together with other fruit trees and cereal crops enabled the development of a dynamic economic activity, nevertheless vulnerable to the caprices of nature, to changes in tastes and market behavior and, more recently, to labor shortages leading, consequently, to a more mechanized vineyard activity so that wine production remains feasible (FRAH 2000: 32).*

The total area of the DDR accounts for 250,000 ha; almost 120,000 ha are usable land, but only 38,588 ha are planted with vineyards, spread over 85,000 parcels owned by 33,000 small wine producers. Each producer owns an average area of 1.17 ha. Small farms are spread throughout the DDR, creating the need for WCs, involving roughly 17,000 wine growers.

Among the Portuguese agricultural regions, the DDR is the greatest wine producer, representing about 20% of the national production. Moreover, almost 50% of the value of the 1996 Portuguese wine sold was from DDR, due mainly to Porto wine sales that represented 42% of the total Portuguese sales (Rebelo 2001). The importance of DDR is unsurpassed in the Portuguese wine industry.

Table 1 shows production in DDR during the 1990s, as well as DDR-WCs market share. Total production has important annual oscillations that mainly affect table wine, averaging 1,282,676 hectoliters. In low production years, such as 1994, table wine production is clearly a surplus of the more valuable Porto wine (see Table 2, below). WCs produce a greater percentage of table wines in the DDR than their non-cooperative counterparts. Based on data for all WCs, table wine represents 57% of total DDR-WC wine production, while table wine accounts for only 47% of total DDR production, including both DDR-WC and non-WC production. WCs table wine production accounts for 58% of its total DDR production and WCs Porto wine for 38% of DDR Porto production. DDR-WCs are of great importance to the regional vine growing *filière*.

**Table 1. Annual Production of Wine for the DDR-WCs and DDR (1989-1998), in hectoliters**

Years	DDR-WCs			DDR		
	Table	Porto	Table + Porto	Table	Porto	Table + Porto
1990	134,277	361,279	495,556	228,993	950,769	1,179,761
1991	583,022	347,226	930,248	1,097,085	846,813	1,943,898
1992	537,378	311,064	848,441	832,359	644,556	1,476,915
1993	407,000	167,332	574,332	732,309	440,297	1,172,606
1994	213,235	176,930	390,165	331,705	470,525	802,230
1995	213,648	212,520	426,168	338,888	593,071	931,959
1996	259,254	242,451	501,705	515,152	711,425	1,226,577
1997	600,006	271,090	871,096	1,105,605	714,984	1,820,588
1998	193,078	249,117	442,195	264,011	725,544	989,555
<b>TOTAL</b>	<b>3,140,896</b>	<b>2,339,007</b>	<b>5,479,903</b>	<b>5,446,106</b>	<b>6,097,982</b>	<b>1,1544,088</b>
Annual Average	348,988	259,890	608,878	605,123	677,554	1,282,676
Minimum	134,277	167,332	390,165	228,993	440,297	802,230
Maximum	600,006	361,279	930,248	1,105,605	950,769	1,943,898
Table and Porto (%)	57	43	100	47	53	100
DDR-WCs / DDR (%)	58	38	47			

Sources: Annual Reports of the WCs and CIRDD (1999) for the DDR

Table 2 includes financial data on DDR-WCs during 1990-98, in euros (nominal prices). A comparison of 1998 with 1990 is striking. There was a 46% increase in total assets; fixed assets increased 180%, reflecting a decade of strong investment; investment was increasingly supported by members; and cash-flow/gross revenue increased, indicating additional retained funds; other financial indicators included in Table 2 do not have such a clear pattern trend or behavior.

In summary, the DDR-WCs, in the 1990s, experienced a behavior consistent with the growth of the Portuguese economy in this period. The industry invested in new technologies, namely in fixed assets, and improved their leverage and overall financial structure. The improved leverage is vital to survival and competitiveness in the domestic and world wine market, which is possibly linked to the behavior of WC members and manager power.

**Table 2 – 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	3,453,913	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	0.71	0.71	0.705	0.601	0.873



### 3. Conceptual Framework

The co-operative capital constraint hypothesis (Chaddad and Cook, 2002) links the behavior of co-operative members with leverage. According to this hypothesis, agricultural co-operatives are unable to acquire sufficient risk capital to finance profitable investment opportunities<sup>7</sup>. As a result, co-operatives may be insufficiently capitalized to make the necessary investments to grow and remain a viable organization. The various theoretical and empirical arguments that substantiate the claim that agricultural co-operatives are financially constrained stem from five “vaguely defined property rights” problems devolving from the traditional co-operative organizations division of residual claims and control rights (Sykuta and Cook, 2001): Free Rider Problem, Horizon Problem, Control Problem, and Influence Costs Problem. The Free Rider Problem occurs when gains from co-operative action may be realized by individuals who did not fully invest in developing the gains, whether those are new(er) members (internal free rider) or non-members (external free rider). The Horizon Problem results from residual claims that do not extend as far as the economic life of the underlying asset, which causes a disincentive for co-operative members to invest in long term, higher-risk projects. Like the Horizon Problem, the Portfolio Problem stems from the restricted nature of the equity in the co-operative; the organization’s investment portfolio may not reflect the interests or risk attitudes of any given investor/member, but members cannot withdraw and reallocate their investments. The Control Problem is similar in nature to the shareholder-manager problem in investor-owned firms (IOF), but is compounded 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 incumbent to all organizations where decisions affect wealth distribution among members. The costs are greater when there are different interests among group members and when the potential gains are great.

New institutional economic theories of agency, property rights, incomplete contracting and Williamson’s transactions cost economics have been advanced to provide a finer theoretical focus by which to analyze the structure of transactions and their governing

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<sup>7</sup> According to Cook (1994), many co-operatives and managers and writers have argued that the most difficult challenge in contemporary co-operative management is acquiring equity capital, with members being reluctant to contribute with more equity capital because (1) the return on investment at the farm level is greater than return on investment in the co-operative; (2) for free-rider reasons or because of heavy discounting of patronage refunds, the member underestimates the value of the co-operative; and (3) the member over values return on investment on the farm. Additionally, geographic and commodity scope may limit number of members and consequently the amount of capital that could be raised.

institutions (Sykuta and Cook, 2001). These theories suggest how the rights and responsibilities of incumbents to the transactions are allocated will depend on the characteristics of transactions costs, the costs of monitoring and enforcement, the relation of the trading parties, and their respective negotiating skills or bargaining positions.

Coalition theory (Russo, et al., 1999) states that co-operative consists of many groups having different objectives and attempting to maximize their own individual utility even at expense of other groups. This situation is particularly relevant to agricultural co-operatives because costs and benefits can be allocated among groups according to a variety of rules (Zusman, 1982). By setting prices for member products, offering specific services and choosing capitalization strategies, the coalition decides which group will benefit and which one will bear the cost of operations. Then, each group decides which strategy to support, considering that total returns may become more attractive if it is possible to shift a portion of the cost to another group. 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 no incentive to negotiate an efficient solution based on the compensation principle. As consequence, the strategy of the co-operative 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, the co-operative members (principal) and the manager (agent).

According to agency theory (Fama, 1980 and Fama and Jensen, 1983a and 1983b), the managers act as agents of the principal and attempt to optimize the value of their pecuniary and non-pecuniary rewards. Management behavior implied by agent utility maximization allows for differences between profit maximization and per-unit price optimization objectives of IOFs and co-operatives. Since DDR-WCs managers are compensated on fixed wages, not performance, they are expected to support risk minimizing strategies rather than returns to members. Accordingly, it is hypothesized that when managers effectively influence the capital structure through their bargaining power, the expected average equity/asset would be higher, more sensitive to risk and less sensitive to the profitability and cost of financing (Russo et al., 1999).

To test these hypotheses concerning manager power, member power, and capital structure, we use DDR-WC panel data from 22 co-operatives observed during 9 years, yielding a total of 198 observations. The data were collected from financial statements of each co-operative. 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-WCs capital structure.

#### **4. Methods and Results**

Following Russo et al. (1999), we modeled the capital structure of DDR-WCs as a function of co-operative profitability, the cost of debt financing, the weight of fixed assets on the total assets, manager's power, and the way members participate in the co-operative. 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 individual behavior of members.

##### **Manager's power**

A quantitative measure of the manager power of DDR-WCs, i.e., the ability of effectively influence the strategies by imposing his/her preferences on the other groups within the co-operative is based on Russo et al. (1999)<sup>8</sup>. An indicator was computed considering that managers have incentive to keep resources within the co-operative, where they may control them. Powerful managers reduce resource transfer to members, both in terms of profits and patronage. Table 3 defines the two indicators of manager power and expected correlations with manager power. PPI measures the percentage of annual revenues transferred to patrons/members, which is expected to be negatively correlated to manager power. Pci measures the percentage of annual revenues retained by the co-operative, which is expected to be positively correlated to manager power. Based on 198 observations of DDR-WCs, we calculated in the final column the correlation between each index and cooperative leverage, as measured by the equity /asset ratio.

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<sup>8</sup> Russo et al. also consider the number of members and the member participation in the co-operative management. Because we don't have information on these variables we will not consider them.

**Table 3 – Determining factors of managers power index (PWi)**

Indicators	Description	Definition	Expected correlation with manager power	Correlation with equity/asset ratio <sup>1</sup>
PPi	Percentage of annual revenues transferred to patrons/members	PR/R, where: PR = Patronage refund, i.e., value of grapes; R = Revenues	Negative	-0.0475
PCi	Percentage of annual revenues retained by the co-operative	(NIAT+Dep)/R, where: NIAT = Net income after taxes retained; Dep = Depreciation	Positive	0.410

<sup>1</sup> Computed for the 198 observations (9 years x 22 DDR-WCs).

Following (Russo et al., 1999) these two indicators are aggregated into an overall manager’s power index (PWi), calculated for each cooperative in each year.

$$(1) \quad PWi = f(-PPi) + f(PCi).$$

The function f is defined as:

$$(2) \quad f(x_{ij}) = \begin{cases} 1 & \text{if } x_{ij} \geq \bar{x}_j + s_j \\ 0 & \text{if } x_{ij} \leq \bar{x}_j - s_j \\ \frac{x_{ij} - (\bar{x}_j - s_j)}{2s_j} & \text{if } \bar{x}_j - s_j < x_{ij} < \bar{x}_j + s_j \end{cases}$$

where:  $x_{ij}$  is the value of the two variables (PPi and PCi) for the  $i^{\text{th}}$  co-operative;  $\bar{x}_j$  is the sample mean of variable j; and  $s_j$  represents the sample standard deviation.

The value of PWi can range from -2 to +2. A positive value denotes strong management power, i.e., effective bargaining power of managers (Powerful Manager Co-operatives or PMC), while a negative value implies absence of management bargaining power (Non Powerful Manager Co-operatives or NPMC). Agents are expected to first maximize manager’s utility, and then, maximize members’ utility. The null value indicates a neutral or balanced distribution between these two objectives. The PWi indicator is subsequently redefined as a zero-one indicator variable that is incorporated in the equity/asset regression model. Define PM as the indicator of manager power, where  $PM = 1$  if  $PWi > 0$ , otherwise  $PM = 0$ .

Table 4 presents the PMC, neutral and NPMC results for the DDR-WCs, over the nine-year study period. The majority of the DDR-WCs (79%) had a neutral or balanced behavior of managerial power. This finding is consistent with the fact that many of WCs are managed on a voluntary basis (Rebelo et al., 2002). Interestingly, not all indicators in Table 4 have the highest average values for PMC. This only occurs for cash-flow and equity.

Consistent with theory, the least leveraged WCs are managed by PMCs. This observation is evident by comparing the average equity/assets ratio, which is 0.36, 0.23 and 0.24 for PMC, neutral and NPMC, respectively.

**Table 4 – Descriptive statistics (average) for PMC, Neutral, NPMC and number of total observations (Euro values in millions)**

	PMC	Neutral	NPMC	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-WCs

### 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<sup>9</sup>. Each was asked: *“Do the members behave individualistically, viewing the co-operative simply as buyer of their products and “leaving” the co-operative 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 co-operative. Define the indicator variable for individualistic behavior of members (IB), as IB = 1 if the answer is yes and members are perceived to vote according to individual interests rather than co-operative interests, zero otherwise. Individualistic behavior is expected to have a negative influence on capital structure. Like PM, this indicator variable was subsequently 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 5. The equity asset ratio is specified as a linear function of the five exogenous variables described in Table 5, along with expected parameter signs.

<sup>9</sup> This survey took place in 1998/1999, using face-to-face interview techniques. For more details see Rebelo et al (2002).

**Table 5 – Exogenous variables of the equity/asset model**

Variable	Description	Definition	Expected sign
Prof	A proxy for co-operative 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
PM	An indicator variable for the power of manager co-operative	PM = 1, if PW >0 PM = 0 if PW =0	Positive
IB	An indicator variable of member behavior	IB =1 if the behaves individually 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). Statistical results are given in Table 6. Heteroskedasticity was detected with a White test and corrected for using the Newey-West method<sup>10</sup>. All signs of estimated coefficients coincide with the expectations outlined in Table 5.

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<sup>11</sup>. Manager's power and member behavior are significant and conflicting determinants of co-operative capital structure. The positive sign of the FATA coefficient indicates that managers, in general, adopt a good management practice to reduce risk-induced operating leverage. Additionally, the model provides statistical evidence of a 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 co-operative.

<sup>10</sup> A White test detected the presence of heteroskedasticity at the 5% level of significance.

<sup>11</sup> Since Portugal joined the European Community in 1986, DDR-WCs were able to make investments in new technology financed by subsidies that pay more than 60% of investment costs European Agricultural Guidance and Guarantee Funds – Guidance (EAGGF-G), reducing leverage needs.

**Table 6 – 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
PM	0.082*	2.710
IB	-0.047*	-3.746
GLS weighted R <sup>2</sup>	0.284	
F-statistic	12.62*	
Durbin-Watson statistic	1.815	

\* Significant a 5% level

## 5. Conclusions

In Portugal, the organizational and legal form of traditional co-operatives continues to constitute the most practical and common means of achieving vertical co-ordination of the production, processing and marketing for small wine growers. This situation is essential for the Portuguese wine market because co-operation offers significant economies of scale, giving firms countervailing power at the price formation stage rather than leaving them with the only other means of increasing producer surplus—minimizing costs.

In the case of the DDR, 22 wine co-operatives were formed during the 1950s and 1960s to perform vinification operations and to stock the wines produced. However, bottling operations were not performed because wines were sold primarily in bulk. The nature of WCs changed in the nineties. European Union (EU) funds enabled most WCs to invest in improved vinification and to vertically integrate into bottling.

Like many other agricultural co-operatives, the DDR-WCs 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-WCs. As expected the results of the model show that during the 1990s (1) managers, in general, had a positive influence in the determination of the equity asset ratio (capital structure), (2) the individualistic behavior of co-operative 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 negative consequences on the capital structure/leverage of the co-operative. DDR-WCs have much to gain if these conflicting groups are able to promote common views and perceive the environment in the same way. By striving to achieve the same goals, DDR-WCs may increase overall efficiency, which is essential to facing the increasingly competitive world wine market. The traditional co-operative model adopted by DDR-WCs may be not adequate for developing the degree of the market orientation needed in a more competitive situation where risk-taking and extensive investments in new products are part of the decision-making process. Consequently, a different model of co-operative may be essential to solve the conflicts over residual claims and decision control, namely the New Generation of Co-operatives (Cook and Iliopoulos, 1999).

Future research should focus on how to implement the new generation of co-operatives. Two issues are of particular importance in this context: (1) member investment minimizing behavior must be better understood, namely including the degree of membership heterogeneity; and (2) improvement of the co-operative internal bargaining process among stakeholders (members and managers).

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## **Appendix**

CIRDD = Comissão Interprofissional da Região Demarcada do Douro

Dep = Depreciation

DDR = Douro Demarcated Region

DDR-WCs = Wine Co-operatives in Douro Demarcated Region

FATA = Ratio between Fixed Assets and Total Assets

IB = Dummy Variable of the Members Behavior

Int = Proxy for the Cost of Debt Financing

Inte = Interest Expenses

IOF = Investor-Owned Firms

NIAT = Net Income After Taxes Retained

NPMC = Non Powerful Manager Co-operatives

PC<sub>i</sub> = Percentage of annual revenues retained by the co-operative

PM = Dummy for the Powerful of Manager Co-operative

PMC = Powerful Manager Co-operatives

PP<sub>i</sub> = Percentage of annual revenues transferred to patrons

PR = Patronage Refund

Prof = Proxy for Co-operative Profitability

PWCs = Portuguese Wine Co-operatives

Pwi = Managers Power Index

R = Revenues

T = Annual Trend Variable (to catch structural changes)

TA = Total Assets

WCs= Wine Co-operatives