Long-term Financing in US and European Agricultural Co-operatives: Emerging Methods for Ameliorating Investment Constraints

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Abstract

During recent years, dramatic changes in the world food system have led to unprecedented competition between agribusiness firms. To compete in this environment, agricultural co-operatives should invest substantially in long-term activities such as R&D and advertisement. Co-operatives have a difficult problem in acquiring equity capital because the residual claimant (benefactor) is the patron of the firm, not the investor. This organizational design poses to co-operatives three investment constraints: a) the free rider problem, b) the horizon problem, and c) the portfolio problem. Empirical analysis utilizing a latent variable structural equation model and a large dual response survey suggests that in the U.S. member-patrons are more likely to invest in co-operatives which adopt well defined property rights policies and structures than traditional co-operatives characterized by vaguely-defined property right structures. Agribusiness co-operatives in the European Union are gradually adopting long-term financing methods that possess one or more of the characteristics found in successful U.S. 'New Generation Co-operatives.' However, it seems that they have paid less attention in designing their organizational structures (e.g., membership policies). This may inhibit their efforts to gain a competitive advantage over investor-owned firms.

Keywords: Agribusiness co-operatives, Investment constraints, Structural equation model

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1. Introduction

Intensified competition in the increasingly global and industrialised food and fibber sector (Barkema et al., 1993; Urban, 1991; Sexton, 1991) have led several scholars to question the ability of European Union agribusiness co-operatives to play an important role in the future agri-food system (e.g., Ollila and Nilsson, 1997). One of the major obstacles facing co-operatives is their difficulty to raise the risk capital necessary to finance long-term strategies in R&D, advertising, and technology (Cook and Iliopoulos, 2000; Theodorakopoulou et al., 1998). Faced with similar constraints in the 1990's, US co-operatives leaders successfully have designed and introduced a new institutional arrangement, the new generation cooperative (NGC) (Cook and Tong, 1997; Harris et al., 1995).

While NGC's have been studied extensively (e.g., Cook and Tong, 1997; Harris et al., 1996; van Dijk, 1997), little attention has been paid to comparing them to European agricultural co-operatives (e.g., Lang et al., 2001). This research partially fills this knowledge gap by providing empirical evidence on the ability of NGC's to overcome the investment constraints facing more traditional co-operatives. Subsequently, the most crucial organizational characteristics of NGC's are identified and compared to similar characteristics emerging in their European counterparts. It is argued that while the long-term financing methods used by European co-operatives are moving towards the right direction, these organizations have not yet adjust their organizational structures. Historical and cultural reasons may explain this tendency.

The paper is organized as follows. First, three critical investments constraints facing traditional co-operatives are identified and discussed. Then, proposed methods for ameliorating these constraints are analysed. In the third part of the paper a structural equation model is constructed and tested using data from a comprehensive survey of US traditional and new generation co-operatives. The empirical analysis results in the identification of the organizational characteristics of NGC's that provide incentives to cooperative members to invest in their organizations. The fourth part of the paper is devoted to the comparison of NGC's and selected large European agribusiness co-operatives and the identification of hypothesized crucial differences. The last section draws conclusions intended to provide leaders of European co-operatives with an understanding of the limitations they may face due to a misalignment of adopted financing methods and organizational arrangements.

2. Investment Constraints in Agribusiness Co-operatives

Equity capital acquisition has long been cited as a problem for co-operatives (Hansmann, Harte and Moore, Olson, Cook). In co-operatives, member-patrons usually contribute equity capital through patronage methods rather than explicit investment methods. In United States agricultural co-operatives, equity capital is typically provided by utilizing one of these approaches: direct investment, retained patronage refunds, or per-unit capital retains. The largest, rapidly growing Western European co-operatives acquire risk capital through one or more of the following

methods: ownership of a PLC[1], outside investors, patronage shares, dividend-bearing retains, retained earnings, earning augmentation, or investment shares. The actual capital acquisition method utilized is determined by the type and function of the cooperative.

Equity capital acquisition in co-operatives is viewed as a problem for three reasons: (1) the free rider problem, (2) the horizon problem, and (3) the portfolio problem.[2] These problems emerge because in most traditional co-operatives, ownership per se conveys no benefit; instead benefit is obtained only when members patronize the cooperative. Each of these three cooperative investment problems involve opportunistic behaviour by member-patrons and their evaluation of the set of cooperative property rights adopted to address residual claim and residual rights of central issues.

The free rider problem emerges in co-operatives when property rights are non-tradable, insecure, unassigned, or ill defined. This problem can emerge in two forms: external and internal. The external free rider constraint is a common-resource problem, which arises when property rights are non-tradable, insecure, or unassigned. Cooperative property rights are not well suited and enforced to ensure that current member-patrons, or current non-member-patrons, bear the full costs of their actions and/or receive the full benefits they create. This situation occurs particularly in open membership co-operatives. An example would be when a pear producer refuses to join the membership of a pear bargaining association but captures the benefits of the negotiated terms of trade. A more complex type of free rider problem occurs when dealing with the common property problem (or insider free rider problem). This occurs when new members obtain the same patronage and residual rights as existing members and are entitled to the same payment per unit of patronage. This set of equally distributed rights combined with the lack of a market to establish a price for residual claims that reflects accrued and present equivalents of future earnings potential creates an intergenerational conflict. Because of the dilution of the rate of return to existing members, a disincentive is created for them to invest in their cooperative.

The horizon problem refers to the disincentive for cooperative members to invest in long-term projects. Benefits' flowing to the patron instead of the investor is the genesis of this cooperative investment problem also. Specifically, the horizon problem occurs when a member's residual claim on the net income generated by an asset is shorter than the productive life of that asset (Porter and Scully). This problem is caused by restrictions on transferability of residual claimant rights and the lack of liquidity through a secondary market for the transfer of such rights. The horizon problem creates an investment environment in which there is a disincentive for members to contribute to growth opportunities. The severity of this problem intensifies when considering investment in research and development, advertisement, and other intangible assets. Consequently, there is pressure on the board of directors and management to (a) increase the proportion of the cooperative's cash flow devoted to current payments to members relative to investment, and (b) accelerate equity redemptions at the expense of retained earnings.

The third cooperative investment problem we call the portfolio problem. The portfolio issue can be viewed from the cooperative firm's point of view as another equity acquisition problem. The lack of transferability, liquidity, and appreciation mechanisms for exchange of

[1] The PLC is an investor-owned holding company or subsidiary owned by the cooperative. For a detailed description of the governance structure of co-operatives and PLC's the interested reader is referred to Lang et al., (2001); Harte, 1997.

[2] For an in-depth theoretical and empirical analysis of the three vaguely defined property rights, the reader is referred to Iliopoulos Constantine. 1998. *A Study of the Property Rights Constraints in US Agricultural Co-operatives: Theory and Evidence*. Unpublished Ph.D. Dissertation, University of Missouri-Columbia.

residual claims prevents members from adjusting their cooperative asset portfolios to match their personal risk preferences. The cause of this problem is again the tied-equity issue—the investment decision is "tied" to the patronage decision. Therefore, members hold sub optimal portfolios, and those who are forced to accept more risk than they prefer will pressure cooperative decision makers to rearrange the cooperative's investment portfolio, even if the reduced risk portfolio means lower expected returns.

Traditionally co-operatives have attempted to mitigate the investment problems by retaining earnings as member equity. But in co-operatives, members demand that earnings retained for investment must eventually be returned to the member-patrons. Consequently, cooperative equity capital might be viewed as a form of debt. The redemption of this equity-quasi debt eventually places a burden on the cooperative's asset base and leads to slower growth. For members, this equity is usually returned at book value regardless of the value of the cooperative business itself. Hence, members do not receive a return on their investment reflecting firm growth value unless the cooperative is dissolved or sold.

2. Proposed Solutions to the Investment Constraints in Agribusiness Co-operatives

Several remedies have been proposed in the literature for solving the cooperative investment property rights problems. A closed membership policy complemented with marketing agreements[3] has been proposed as a solution to the free rider issue, particularly the insider free rider constraint (Condon 1990; Staatz 1987a; Vitaliano 1983; Porter and Scully 1987). A second solution for the free rider problem is the establishment of a secondary market for cooperative shares. Transferable and appreciable shares would ensure existing members of the ability to capture the full value of their investment in the cooperative and, thus, create an incentive to invest in their organizations, since the fear that new members would also share future earnings associated with their investment is eliminated.

The existence of a secondary market for cooperative shares has also been proposed as an important prerequisite in dealing with the horizon and portfolio problems. When shares are transferable and appreciable, inactive members and members near the end of their patronage horizon possess the ability to retrieve a portion of their equity capital through the sale of their equity stock. That is, the present value of the cooperative's estimated future income stream becomes capitalized into the value of the stock[4] or delivery right.

Additionally, transferability and appreciability of cooperative shares enables members to match their individual risk preferences to the risk associated with the cooperative investment portfolio and thus ameliorate the portfolio constraint. The adoption of an equity redemption plan[5] with short revolving periods has also been suggested as a remedy to the horizon problem (Cook

[3] Marketing agreements are contracts between individual members and the cooperative, used in marketing co-operatives, to specify the volume and the quality of the commodity supplied by each member to the cooperative.

[4] In the emerging new form of co-operatives (new generation co-operatives) stock and delivery rights are used interchangeably.

[5] Equity redemption plans are ways in which the cooperative returns to its members the amount they have invested. While several methods for evolving members' equity exist, the base capital plan method is the most effective in returning members' equity in a timely fashion. Co-operatives adopting a base capital plan determine a member's equity obligation annually based on the cooperative's need for capital and on the member's use of the cooperative. Underinvested members continue to invest, while overinvested members generally begin to receive redemption of their excess investment.

1995; Staatz 1987a). Finally, separate capital pools[6], adopted by multi-purpose co-operatives, allow members to assume a level of risk as close to what they prefer as possible and thus are hypothesized to correct for the portfolio problem.

Since 1990 a new form of agricultural cooperative has been emerging. Its growth has been explosive (Harris et al.). The difference between the "new generation" cooperative and the traditional cooperative is in the property rights structure. The new generation cooperative has a more clearly defined membership policy (closed - or well defined), a secondary market for members' residual claims, patronage and residual claimant status restrictions, and enforceable member pre-commitment mechanisms. This is in contrast to the traditional co-operatives described above whose property rights structure is characterized by open membership, capital generated by earnings from patronage, and illiquid ownership rights.

Our empirical objective is to explore the impacts that property rights modifications might have on the incentive for a member-patron to invest in his/her cooperative. The hypothesis tested in the empirical model is:

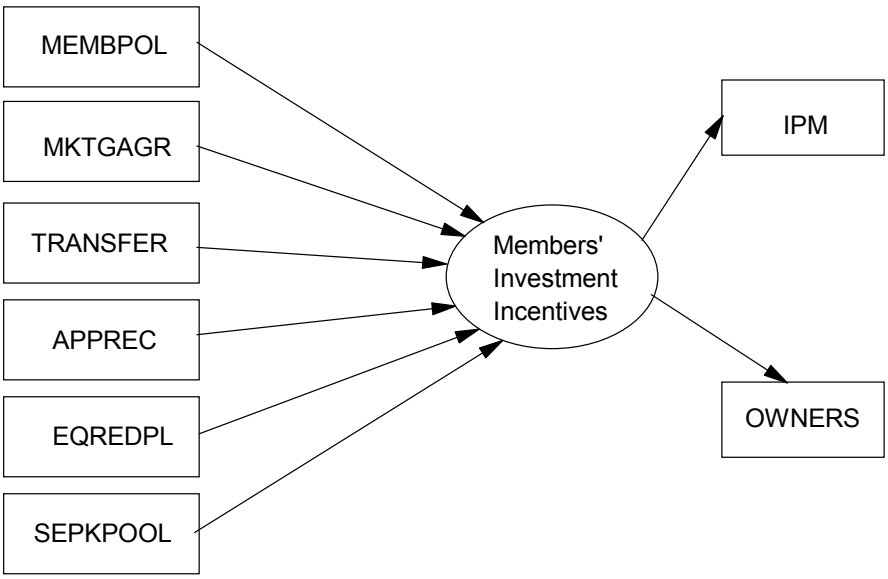
Characteristics in a well-defined property rights structural cooperative such as closed membership, obligatory member commitment, and transferable and appreciable equity instruments would result in greater incentives to invest in a cooperative than ill-defined property right policies in traditional co-operatives characterized by open membership, voluntary member commitment, non-transferrable and non-appreciable equity instruments, and no formal short-term equity redemption plan.

3. An Empirical Test of the Proposed Solutions

To identify which of the aforementioned policies have a significant impact on the investment incentives of members, a structural equation model was estimated based on the following path diagram, which summarizes the main hypothesis.

[6] In multi-purpose co-operatives adopting a single capital pool, members' equity and leverage (debt) capacity are pooled together. This results in some members' equity used to subsidize investments that do not benefit them. As a result, members' willingness to invest in the cooperative is decreased.

Figure 1. Investment Property Rights Constraints
in US Agricultural Cooperatives : The Path Diagram



The independent exogenous variables on the left-hand side are: (1) Membership policy (MEMBPOL): whether the cooperative has an open or defined membership policy; (2) marketing agreement (MKTGAGR): whether members sign a marketing agreement or not; (3) transferable delivery rights (TRANSFER); (4) appreciable delivery rights (APPREC); (5) equity redemption plan (EQREDPL): whether the cooperative returns members' equity capital in a structured program; and (6) separate capital pools (SEPKPOOL): whether the equity capital of the various sub-groups of members is allotted to non-netting separate control and monitoring accounts.

"Members' Investment Incentives" is a latent variable measured by two solvency ratios: (1) IPM indicates investment per member defined as a modified ratio of members' equity to the number of members, and (2) OWNERS, indicates the ownership ratio, calculated by dividing members' equity by total cooperative assets. These ratios were calculated by the officially audited financial reports of 127 co-operatives representing more than 75 percent of the total 1996 gross sales by US agricultural co-operatives (Farmer Cooperative Statistics). The other relevant solvency ratio examined was the term debt to fixed assets ratio[7] (CoBank). However, none of the calculated correlations between this ratio and the observed variables exceeded ±0.002. Hence only IPM and OWNERS are used as indicators of members' investment incentives. Since the data analysed focus exclusively on internally generated risk capital, the problem of accounting for investment incentives provided to outside investors is not considered to be serious[8].

[7] The term debt to assets ratio measures the relationship between long-term debt and fixed assets. It indicates whether term debt has been repaid in accordance with the expected life of fixed assets.
[8] Another abstraction from reality is the implicit assumption that cooperative members are relatively homogeneous and thus IPM accurately represents the average of members' investment in the cooperative.

A dual-response[9] mail survey was used to gather data on cooperative organizational characteristics and policies. The targeted sample of US agricultural co-operatives included the population of Sapiro II, Sapiro III, and Nourse II co-operatives and one hundred Nourse I co-operatives[10]. As mentioned earlier, the chosen sample represented more than 75 percent of the total 1996 gross sales by US agricultural co-operatives. The choice of this sample was based on three criteria: (1) representative of US agricultural co-operatives; (2) includes both traditional and new forms of collective action; and (3) it is substantial, so that statistical inference is accommodated. Of the 200 co-operatives meeting the aforementioned set of criteria, the dual response rate was 63.5% (127 co-operatives) when both respondents completely participated.

Before constructing the path diagram, the nature of causality between the variables was determined. The approach to satisfying the three necessary conditions for establishing causality (1) pseudo-isolation, (2) association, and (3) direction of causality was to include in the model all exogenous variables theoretically justified and then test for association and direction of causality. During this process, the data indicated that only those co-operatives allowing transferability of delivery rights had delivery rights with the potential to appreciate/depreciate. Therefore, these two variables were treated as a single variable (TRANSFER) to minimize multicollinearity problems. Also, since it was expected that the errors in independent variables would be highly correlated, a structural equation model was preferred to simple regression techniques because of its ability to deal with the existence of such correlation and provide robust estimates of the underlying relationships.

The associations between independent and dependent variables were tested by means of calculating the tetrachoric correlations between dichotomous variables and biserial correlation between dichotomous and continuous (IPM, OWNERS) variables (Bollen, 1989). The obtained correlation matrix indicated a very weak association between EQREDPL and all other variables in the model. SEPKPOOL was significant, but only at the 0.01 level.

Direction of causality was established based on temporal priority. That is, all exogenous independent variables (*X*'s) are cause indicators of the latent variable, members' investment incentives, rather than effect indicators.

Subsequently, the path diagram of causal relationships was converted into the following equations:

$$\eta = \Gamma x + \zeta \quad (1)$$

$$y = \Lambda_y \eta + \varepsilon \quad (2)$$

where η is the 1x1 matrix of endogenous dependent latent variables (Members' Investment Incentives); Γ is the 1x4 matrix of coefficients linking the exogenous observed variables to the latent variable; x is the 4x1 matrix of exogenous observed variables; ζ is the 1x1 matrix of the error in latent variable; y is the 1x2 matrix of endogenous observed indicators (IPM, and

[9] Two questionnaires were mailed to each cooperative firm: one to be answered by the Chief Executive Officer and the other by the Chief Financial Officer. The first provided information on organizational and policy issues while the latter answered questions regarding the financial policies of the cooperative.

[10] Cook describes a taxonomy of co-operatives, of which four types are of relevance for this study: 1) the Nourse I local multipurpose co-operatives, 2) the Nourse II regional multi-purpose co-operatives formed by local co-operatives, 3) Sapiro II processing and/or marketing co-operatives, and 4) Sapiro III, or new generation marketing co-operatives. The names of these co-operatives were chosen in order to indicate their founding motive. Nourse co-operatives were founded by farmers adapting Nourse's philosophy of ameliorating market failures—often called the "competitive yardstick" school of cooperation. On the other hand, Sapiro co-operatives adapted the organizational strategies proposed by Sapiro – in order to extract rents downstream in the food chain.

OWNERS) of the latent variable η; Λ_y is the 1x2 matrix that contains the coefficients linking the latent variable to its indicators; and ε is the 1x2 matrix of the errors in measuring the observed endogenous variables.

Four additional matrices needed to be defined before the model was fully specified. Θ_ε is the 2x2 matrix of prediction errors for indicators of endogenous constructs, with only one non-zero element in this case. Θ_σ is the 4x4 matrix of prediction errors for the cause indicators of the latent variable. Φ is the matrix of correlations among exogenous latent variables, which in this model has all its elements equal to zero, since no exogenous latent variable is included in the model. Finally, Ψ is the 1x1 matrix of correlations between endogenous latent variables; in this case, it has only one element, $\Psi = \mathrm{Var}(\zeta)$. This model was used to estimate all coefficients.[11]

The software PRELIS 2.0® was used to inspect continuous variables for outliers and no outliers were found[12]. Furthermore, the data on the continuous variables (IPM, and OWNERS) were inspected for divergence from normality, and excessive kurtosis and skewness. Both IPM and OWNERS were found to have negative skewness and kurtosis. In such cases, a logarithmic transformation of the variable may solve the problem (West et al. 1995, p. 71). After the transformation both variables approximated the normal distribution; IPM at the 0.05 level of significance, and OWNERS at the 0.01 level of significance.

The correlation matrix of all observed variables was used as input for estimating the model. However, since all exogenous observed variables (*X*'s) are dichotomous variables, the Pearson product-moment correlation is inappropriate (Hair et al., 1996). To allow for incorporation of the non-metric measures into the structural model, different types of correlations were calculated. When both variables were dichotomous (for example MEMBPOL and TRANSFER), the tetrachoric correlation between these variables was calculated. When one variable was dichotomous, while the other was continuous, the biserial correlation of the variables was computed.

LISREL 8.0, Interactive for Windows® was the software used for estimating the model. When non-normality threatens the validity of the widely used maximum likelihood estimator, it is more appropriate to employ an alternative estimator that allows for non-normality and is asymptotically efficient (Bollen). The weighted least squares (WLS) estimator was used. The major advantage of the WLS estimator is that it does not assume that variables are multinormally distributed, a condition necessary for using any of the maximum likelihood, generalized least squares, or unweighted least squares.

The model was then identified (i.e., examined for positive degrees of freedom):

$$\text{d.f.} = \tfrac{1}{2}(p+q)(p+q+1) - t = \tfrac{1}{2}(4+2)(4+2+1) - 16 = 5,$$

where, p and q are the number of independent and dependent observed variables, respectively, and t is the number of parameters to be estimated[13]. The paths from the latent variable to its indicators have been set to one, under the assumption that the two dependent observed variables are reasonably accurate indicators of members' investment incentives. All other parameters were estimated within the model. The obtained results are shown in the path diagram (Figure 2).

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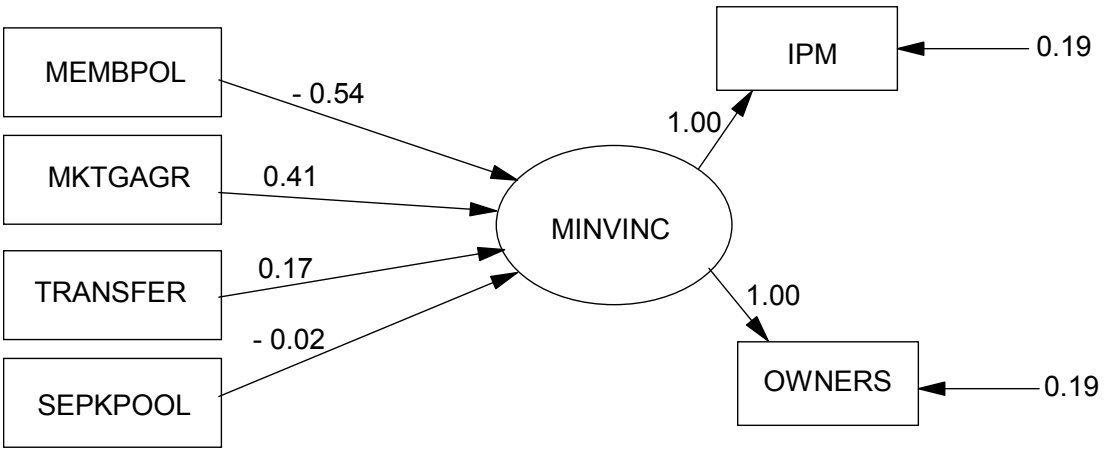
[11] In this step the validity and reliability of indicators were also established. Space considerations preclude the discussion of these issues.

[12] PRELIS 2.0 was used to create a scatterplot of IPM against OWNERS, and visual inspection for outliers was performed.

[13] The parameters to be estimated include the correlations between the measurement errors of the observed independent variables but do not include the coefficients that have been normalized.

Figure 2. Investment Property Rights Constraints
in US Agricultural Cooperatives :
Path Diagram with Estimated Coefficients



A more detailed presentation of the estimates is included in Table 2; no offending estimates were obtained from the model estimation.

Table 1. Investment Property Rights Constraints Model -- WLS Estimates

Parameter	Coefficient Estimate	St. error	t-value
γ_{11}	- 0.54	0.13	- 4.18
γ_{12}	0.41	0.15	2.81
γ_{13}	0.17	0.11	1.52
γ_{14}	- 0.02	0.07	- 0.36
λ_{11}	1.00[a]	--	--
λ_{12}	1.00[a]	--	--

$X^2 = 9.38$, $X^2_{Critical} = 11.070$ (5%)
d.f. = 5
P = 0.09467
RMSEA = 0.083
[a] Parameters constrained through normalization

Measures of absolute and incremental fit for the estimated model are reported in Table 2.

Table 2. Goodness-of-fit Measures for Investment Property Rights Constraints Model (H_1)

Measures of Absolute Fit	Acceptable Range
Chi-square (χ_2) Statistic = 9.38 (5 d.f.)	Less than 11.07 (at 0.05 level of significance)
Goodness-of-fit Index (GFI) = 0.9972	As close to 1.00 as possible
Adjusted GFI = 0.9883	As close to 1.00 as possible
RMSEA = 0.08	0.05 - 0.08

Measures of Incremental Fit	Acceptable Range
AGFI = 0.9883	As close to 1.00 as possible
Normed Fit Index = 0.9972	As close to 1.00 as possible

4. Interpretation of the Results

The obtained results[14] and the assessment of the fit of the model suggest that the property rights structure of US agricultural co-operatives affects significantly members' incentive to invest in their organizations. The adopted membership policy has the most influence on members' investment incentives. The dichotomous variable MEMBPOL takes the value zero for co-operatives with a defined, or closed, membership policy, and the value 1.0 for co-operatives with an open membership policy. The estimated coefficient of - 0.54, connecting MEMBPOL to MINVINC, indicates that, *ceteris paribus*, 54% of the variation in members' investment incentives can be attributed to variation in MEMBPOL. Consequently, variation in the measurable indicators of members' investment incentives can also be explained, since their coefficients have been normalized, and no indirect effects between variables have been assumed. Similarly, 41% of the variation in members' investment incentives is attributable to variation in members' commitment to the cooperative through an enforceable marketing agreement. As can be seen in Table 1, the estimates for MEMBPOL (adopted membership policy) and MKTGAGR (adoption of marketing agreements between the cooperative and its members) are highly significant at the 0.05 level. However, TRANSFER (whether the cooperative has transferable and appreciable shares or delivery rights) is significant only at the 0.01 level.

The relatively high percentage of variance in members' investment incentives attributed to variance in the adopted membership policy justifies further discussion of this result. The single most important aspect of a closed membership cooperative is that its Board of Directors[15] has a high degree of control over the volume of the commodity supplied by members[16]. Control of supply has been discussed in the cooperative literature as an important determinant of success in management's ability to develop and implement an effective strategic plan, that would increase the profitability of the cooperative firm (e.g., Sexton 1990; Hansmann 1996; Cook and Iliopoulos 1998). Additionally, control of supply has been proposed as a significant determinant of success in cooperative operational policies' effort to coordinate the combined productive endeavours of the cooperative and its members' individual businesses (e.g., van Wassenaer 1989).

Marketing agreements are also an important means of achieving the aforementioned goals of control of supply and coordination. The difference between the estimates of these two property rights characteristics may arise because of their different natures. That is, a closed membership policy does not require the commitment of members' resources to the cooperative goal[17], at least to the extent of a marketing agreement. Marketing agreements usually require that

[14] It should be noted that the obtained results are not deterministic; they indicate trends and causal directions, rather than accurate measurements of the strength of relationships.

[15] Or the founding coalition of members in the case of emerging Sapiro III co-operatives.

[16] While the discussion focuses on marketing co-operatives, it can easily be extended to supply co-operatives. In supply co-operatives, it is rather an issue of control of members' demand for one or more agricultural supplies, than an issue of supply control.

[17] Unless, of course, a significant up-front equity capital investment is required.

a member supply the cooperative for one or more seasons with a specific quantity of a commodity. Co-operatives that use marketing agreements also use severe penalties for members unable or unwilling to fulfil the pre-specified terms of the agreement. Therefore, members may prefer closed membership to a marketing agreement as a mechanism for controlling supply and thus ameliorating the negative impact of the free rider constraint. Additionally, marketing agreements, especially in co-operatives with a small number of members, can seriously threaten trust between members and the cooperative and, thus, some co-operatives may not use marketing agreements, even if they are effective mechanisms for achieving control of supply and coordination (Hansmann 1996).

While membership policy and marketing agreements refer to members' commitment, the third independent variable (TRANSFER) is associated with another important issue. Transferability and appreciability of cooperative equity shares, or delivery rights, are responsible for creating a semi-liquid secondary market for the cooperative's stock. In the empirical analysis, these two property rights characteristics are also proved to be important tools for ameliorating the horizon problem. On the other hand, equity redemption plans do not significantly affect members' investment incentives probably because while they may succeed in aligning user and benefactor rights for investments that pay back within the membership horizons of current members, they fail to do so for long-term investments (e.g., in intangible assets). Additionally, the effectiveness of equity redemption plans is determined by conditions highly dependent upon exogenous events such as changes in the macro-economic environment and the particular characteristics of an industry, which may seriously affect a cooperative's ability to return members' equity in a timely fashion.

An alternative explanation of the low importance of equity redemption plans in the model is derived from the nature of the horizon constraint, which does not arise for investments that pay off in the period in which their costs are incurred. For such investments, an ownership structure characterized by benefits accruing to members in proportion to patronage and revolving equity is optimal[18]. Equity redemption plans, however, may fail to be part of the solution for investments that pay off after their costs have been incurred (e.g., investments in intangible assets such as advertisement or R&D). In this case members, especially if they plan to reduce their share of the cooperative's patronage (e.g., they plan to retire) before the investment in an asset has paid off, are faced with an investment disincentive. On the other hand, transferable and appreciable shares provide a more effective solution to the horizon problem, since members can capture in the market the value of any type of investment they made in the cooperative (van Wassenaer 1989, p. III-6).

Additionally, transferable and appreciable shares offer another way to deal with the portfolio problem. Members' incentives to invest in their cooperative are enhanced when they can choose the level of risk they assume. Therefore, the importance of this variable in the model reveals not only its relevance in solving the free rider and horizon problems but also in ameliorating the portfolio constraint. Another hypothesized solution to the portfolio constraint was the adoption of separate capital pools. However, the impact of this variable was found insignificant. Since only a few co-operatives in the sample had adopted separate capital pools, their positive effects might not have been detected in the model. Alternatively, another explanation may involve the fact that separate capital pools are a relatively new accounting

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[18] In the sense that it does not create investment disincentives for members.

method for enhancing balance between users, owners, and benefactors in co-operatives. Thus it could be assumed that, as a new method, it has not yet demonstrated its positive impact on members' investment incentives or that co-operatives do not make full use of its inherent advantages. Further investigation of the issues pertaining to the portfolio constraint, and more specifically to the adoption of separate capital pools, is fully justified and is reported in forthcoming publications.

The above results can simplistically be summarized in the following manner. Suppose that co-operatives in the sample had to choose either to invest in a new, highly rational, project or not. Suppose further, that the members' investment incentive takes only two values: they are either willing to invest, or not willing to invest. Then, members of those co-operatives that have a closed membership policy, use marketing agreements, and have transferable and appreciable delivery rights, would choose to invest in the project. The members of open membership co-operatives, with no marketing agreements and, non-transferable and non-appreciable shares would not invest in the new project, or would be much less so inclined. Consequently, the transaction costs of equity acquisition would be significantly higher for the latter type of co-operatives. In other words, clarifying property rights leads to the increased probability of creating investment incentives. And while the significance of clearly defined property rights is well established for investor-oriented firms, the point of our paper is that the same holds true for the alternative ownership structures examined in this study.

5. Long-term Financing in EU Agribusiness Co-operatives

How clearly defined are property rights in EU agribusiness co-operatives? During recent years, long-term financing methods in the U.S. and the EU seem to converge. The adoption of tools such as 'investment shares,' and 'delivery and earnings rights' by large European agricultural co-operatives during the last five years provides support for this argument (Lang et al., 2001). These instruments are transferable and appreciable and thus it could be hypothesized that they provide a means of ameliorating the internal free rider and horizon constraints. The emerging long-term financing methods adopted by large European co-operatives suggest that these firms, following their US counterparts, look toward allocated equities and rewarding the contribution of capital to the co-operative enterprise so that they can be more competitive.

It seems that there is no significant need for separate capital pools in European agribusiness co-operatives since usually farmers in Europe are members of more than one cooperative. By implementing such a focus strategy, European agricultural co-operatives avoid potential conflicts of interest between member-producers of competing commodities.

However, the preceding empirical analysis suggests that changes in the organizational structure are also necessary in order to provide members with incentives to invest in their co-operative. A closed membership policy and a marketing agreement tool are needed in order to ameliorate the external free rider problems facing traditional co-operatives. New generation co-operatives in the US have until now been very successful to raise equity capital and manage to control the commodity supplies necessary to serve their extended client base.

Maybe due to historical and cultural reasons, co-operatives in most European countries have been reluctant to adopt both of these policies (Lang et al, 2001; Van Dijk, 1997; Bonus, 1986). This may explain why European co-operatives have until now favoured the ownership of

investor-owned holding companies and subsidiaries as long-term financing methods. Or why they have relied heavily upon unallocated retained earnings, a fact that may jeopardize the future of these co-operatives because the market value of the cooperative to members might greatly exceed the book value of their equity and therefore may create an incentive for them to "“sell” the cooperative (Ollila and Nilsson, 1997). Given the potential problems that the dilution of ownership may have on the ability of farmers to govern effectively their co-operatives (Harte, 1997), cooperative leaders in Europe should be very cautious when using the PLC as a long-term financing method.

Furthermore, attention should be paid to the organizational design requirements of innovative long-term financing tools. That is, as the new generation cooperative example suggest, designing solutions to the three aforementioned investment problems requires a combination of innovative financial tools and control of supply methods. Only in this way a clearly defined property rights structure will emerge, one that provides farmer-members with an incentive to invest heavily in their co-operatives. Decision makers in European agribusiness co-operatives should bear this in mind.

6. Concluding Remarks

New generation co-operatives emerged in the United States in the early 1990’s in an attempt to create a clearly defined property rights structure and ameliorate the free rider, horizon, and portfolio constraints. They provide a useful example for European cooperative leaders. By adopting organizational characteristics such as a closed membership policy, marketing agreements with their members, and issuing transferable and appreciable investment instruments, NGC’s provide their members with an incentive to invest heavily in their cooperative. Until now, the majority of these unique business organizations have managed to become leaders in their respective markets.

Seeking a role in the future food and fibber system, European agribusiness co-operatives have realised the need for innovative methods to finance their long-term strategies. In recent years, a number of such methods have been utilized (e.g., investment shares, delivery and earnings rights) in order to overcome investment problems facing traditional co-operatives. However, if not combined with relevant organizational structures, the use of such financial instruments alone may not suffice. Organizational restructuring is necessary in order to create a clearly defined property rights structure that will provide farmer-members of co-operatives with an incentive to invest substantially in their organizations. European agribusiness co-operatives should rethink their membership policies and adjust them to the long-term financing methods they adopt.

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