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ABSTRACT

Cooperatives are unique among agribusiness firms because their owners are also their customers. This dual nature of patrons means that maximizing profit is one of several optimal strategies the cooperative may pursue. Using a survey of marketing cooperative managers, we examine how membership characteristics and cooperative structure influence cooperative policies. We also study the relationship between member characteristics, cooperative policies and cooperative success. Longer member planning horizons and independent management make profit or price maximization more likely. Cooperative success does not appear systematically related to membership characteristics or cooperative structure. Evidently, cooperative success is not easily measured or explained.

JEL codes: L120, Q130, L200

Key words: cooperatives, retained earnings, success

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Introduction

Cooperatives face many challenges in today's agricultural market. They must compete horizontally with increasingly large investor-owned firms (IOFs) and often must sell their products in markets where only a few extremely large firms act as buyers. Both processing and supply cooperatives are called on to make ever larger investments in capital to serve their diverse member-owners. The size distribution of U.S. farms illustrates the difficulties cooperatives face in meeting the needs of a diverse membership while making business decisions necessary to remain competitive. The *1997 Census of Agriculture* reports that only 7% of all the farms in the United States produced over 70% of the value of agricultural products sold in 1997 while approximately 74% of all the farms in the U.S. produced only about 6.8% of the value of agricultural products sold the same year. Since many cooperatives need assured supplies to operate processing facilities efficiently they need to maintain the commitment of large farmers while still serving the needs of smaller producers.

Cooperatives have been successful because they have met the needs of their member-owners. In the past these needs were usually geography-specific and cooperatives were organized to market local products and/or provide agricultural inputs on a local basis. Because members were located in the same region, they were generally homogeneous and cooperative policies were easier to specify. As the structure of cooperatives has evolved to larger, less geographically dependent organizations, interest in issues of member commitment, control and governance has intensified. The characteristics of owner-members have also changed as commercial farm size has increased and sophisticated management systems have emerged. This has resulted in a more diverse (heterogeneous) membership within cooperatives. As a result, the

goals of members within a given cooperative may diverge (see Staatz (1987) for a discussion of the various ways member characteristics can influence cooperative behavior). Understanding the effect of membership heterogeneity on policy making and control within cooperatives is critical to learning how to maintain member commitment to cooperatives and to understanding how cooperative structures can evolve to best address the emerging needs of member-owners.

This study uses a survey of marketing cooperatives to examine the effect of membership and cooperative characteristics (including member heterogeneity) on the pricing and retained earnings policies the cooperative pursues, and which characteristic-policy combinations lead to cooperative success. The study is limited to marketing cooperatives because their membership is much less diverse than the membership of supply cooperatives. Additionally, there is a well-developed theory of the pricing objectives that marketing cooperatives may choose to pursue (Schmiesing (1989)), which lends itself to empirical examination.

In the survey, cooperative managers were asked questions regarding characteristics of the cooperative's members, its pricing policies and various measures of success. The goal of the study is to determine which member characteristics influence the cooperative's pricing and retained earnings policies, and which policy-characteristic combinations lead to cooperative success. In short, the project's goal is to give some insight into how cooperatives serve their members, and what leads to cooperative success. This information should thus assist cooperative managers, as they attempt to steer their cooperatives to a better competitive position.

The discussion that follows comes in three sections. First, a brief review of the many objectives cooperatives may pursue is given and contrasted with the theory of the (investor-owned) firm. Second, the survey instrument is described, and empirical models

developed. Finally, empirical results are presented and some of their implications discussed.

Cooperative Pricing Policies

Schmiesing (1989) illustrates the three pricing policies that a cooperative processor may pursue. This graph is reproduced here as figure 1. Because total revenue $R(q)$ is given by the cooperative's demand curve less its processing costs, it is non-linear. This implies that both average net revenue (ANR) and marginal net revenue (MNR) - revenue net of processing and other input costs - are first increasing and then decreasing.[1] Similarly, assuming that members behave as price takers in the input market, the supply (AIC) curve the cooperative faces will be upward sloping. This implies that the marginal input cost (MIC) curve will also slope upward, and will be above the supply curve.[2]

There are three points of interest in figure 1. If the cooperative managers choose to maximize the cooperative's profit, they will wish to purchase input until marginal net revenue equals marginal input cost (q_0). This policy gives the largest total revenue available for return to the members, although this amount need not be returned immediately to the members. Instead of maximizing the cooperative's profits, the managers may instead chose to purchase input until the per-unit return to members is largest. This would involve purchasing member output until average net revenue (the total per-unit amount returned to members) equals marginal net revenue (q_1). This ensures that members receive the highest per-unit price possible for their goods. It

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[1]As long as the cooperative's average cost curve is U-shaped and its output demand is linear, the average net revenue curve will first increase then decrease. In a competitive industry at long-run equilibrium, the firm's average total cost will just equal the price it receives for its output. In this case, the ANR curve pictured in figure 1 would be above the horizontal axis for levels of output for which the price the cooperative receives remains above the average processing cost.

[2]The results are valid even if the cooperative faces a perfectly elastic (i.e. horizontal) supply curve.

also guarantees that the cooperative will have revenues available for return to members, which may or may not be returned immediately. Finally, the cooperative may choose to maximize the amount of member output purchased, by purchasing all profitable units of member output. In this case, it will continue purchasing until average net revenue is equal to average input cost (q_2). This ensures that the largest amount of member input is purchased, and that the highest initial price is paid to members, but implies that all payment is made to members when they sell their output to the cooperative, and that nothing will be returned to them at some later date.

Given these policies, we see that $q_1 < q_0 < q_2$, which further implies that the cooperative offers initial per unit prices of $AIC_1 < AIC_0 < AIC_2$. Notice that except when the cooperative is operating at cost, it will have revenue above the initial price it pays, AIC_i, to be returned to members. The total per unit price paid to members can be read from the ANR curve. If members recognize that the per unit price is higher than initially offered, they will wish to sell more to the cooperative than it wishes to purchase. Thus, cooperatives maximizing profit or total price must have some way to limit the amount they purchase from their members.

The unique nature of cooperatives as patron-owned firms makes determining the optimal pricing policy difficult. Members derive benefits both as owners of the cooperative and as suppliers to the cooperative. Maximizing cooperative profits limits the amount purchased from members. This policy benefits the members as owners, but may not be in their best interest as suppliers. Maximizing the total per-unit price also requires limiting the amount of input the cooperative purchases, and so may not maximize members' combined revenue from the farm and the cooperative. Operating at cost ensures that a large amount is purchased, but member revenues as cooperative owners are driven to zero. Thus, determining which policy best serves members as

both owners and patrons will depend on member, cooperative and market characteristics.

Member Characteristics and Cooperative Prices

Given the time-value of money, members would, ceteris paribus, prefer income earlier rather than later, so that a high initial price should be preferred to lower initial price with additional payment at some later date. This suggests that the cooperative best serves members by operating at cost. However, some members may have long planning horizons and prefer to invest in the cooperative in order to generate higher returns in the future. This implies that maximizing the cooperative's profits and deferring payment of some retains may be desirable. Finally, higher per unit prices for input are preferred. This implies that members may prefer the cooperative to maximize the price it pays for its inputs. The characteristics of members influence which of these preferences dominates, and thus help determine cooperative pricing and retains policies.

One of the major influences on member preferences is the planning horizon of members. A straightforward way to measure member planning horizon is member age. Since older members have a shorter time horizon, they are expected to prefer limited retains (Schrader (1989), Fulton and Adamovicz (1993)). Members in the early stages of their career may also wish to limit retains, in order to generate the cash flow needed to start up their farms (Royer and Bhuyan (1993)). Thus, age is expected to have a non-linear relationship to the cooperative's pricing policy, with the oldest and youngest members preferring operation at cost with limited retains. Retired member participation is also assumed to shorten the planning horizon of membership and lead to limited retains. Federated cooperatives (those with other cooperatives as members) are more likely to have membership with longer planning horizons, as members are ongoing businesses themselves, rather than individuals (Schrader (1989)). This suggests that

federated cooperatives are less likely to operate at cost, and more likely to retain some earnings. For the same reason, cooperatives in which members are able to realize share values (either through inheritance or sale at market value or because the membership is attached to the farm, rather than to the individual) should also be able to pursue longer-term strategies, since member planning horizons will be longer. The presence of tradeable delivery rights is one way for members to reap any long-term increases in cooperative profitability (Moore and Noel (1995)), and should thus increase member preferences for profit or total price maximization.

Members who are more committed to the cooperative are likely to be more interested in its long-term viability. This suggests that cooperatives with committed members will find it easier to withhold some retains for investment. Fulton and Adamowicz (1993) discusse several factors influencing member commitment to cooperatives. Among these are the percentage of input the member marketed through the cooperative, and the percentage of the member's total income from marketing through the cooperative (which may influence both committment to the cooperative *and* member dependence on current income from the cooperative). Wadsworth (1991) notes that member size (measured by income) may also influence commitment to cooperatives, with small members less likely to be committed to the cooperative. Cooperatives with fewer and/or larger (especially corporate) members may enjoy higher member commitment, since each member gains a larger share of its investment. Small numbers facilitates collusion between members in the pursuit of longer-term strategies, since the gains per member are much larger, and since free riding (obtaining the benefits the cooperative confers without investing in its success) is much easier to detect with fewer members. Finally, we hypothesize that founding members and those who have patronized the cooperative for many years may be more committed

to the cooperative. Again, cooperatives with more committed members should be better able to pursue strategies involving positive retains, while those with less committed members are more likely to operate at cost.

Bremmers and Zuurbier (1999) study the effect of cooperative structure on member commitment to cooperatives in the dairy industry of the Netherlands. They find that commitment to the cooperative diminishes as membership grows and becomes more geographically dispersed. This suggests that members of large and dispersed cooperatives are more likely to prefer a large initial payment, and that these cooperatives are more likely to operate at cost. On the other hand, as cooperatives expand geographically, especially through mergers (as has occurred in the US dairy industry), local issues become more diluted and cooperative managers may be freed to address issues related to broad markets at the expense of member loyalty. Especially in large federated cooperatives, managers may not always choose to maximize member welfare (Fulton (1989)). Thus, an argument can be made that larger cooperatives are more likely to pursue longer-term profit or price maximizing strategies.

Finally, if the cooperative has a large degree of control over its members, we might expect to see managers maximizing (and retaining a large percentage of) the cooperative's profits. Possible measures of the degree of control a cooperative has over its members include the percentage of business the cooperative does with non-members, the status of membership (managers of increasing membership or closed cooperatives have more control) the ability of cooperative managers to expel or impose financial penalties on members, restrictions on voting in cooperative elections, and a requirement tying investment to delivery rights. Additionally, managers of larger, older cooperatives are more likely to be independent in their choice of

pricing policy (Hind (1997)).

To test the relationship between these four categories (member age and committment to the cooperative, cooperative structure and control of members) and the pricing/retains policy the cooperative pursues, the following estimating equation is posited:

$$
\begin{aligned}
policy_i = \alpha &+ \beta_1 age + \beta_2 patronage + \beta_3 mbrinc + \beta_4 misrc \\
&+ \beta_5 retvote + \delta_1 coopage + \delta_2 mbrno + \delta_3 coopsale \\
&+ \delta_4 federated + \delta_5 growth + \delta_6 tdr + \delta_7 mgtpenal \\
&+ \delta_8 mgtex + \delta_9 voting + \delta_{10} tiedright + \delta_{11} pctnmbr + \varepsilon
\end{aligned}
\tag{1}
$$

Where $\beta's$ give the influence of member characteristics (and indirectly of member commitment to the cooperative) and $\delta's$ give the effect of the cooperative's structure and relative strength of bargaining position vis a vis members. A description of each regressor as well as its influence on pricing/retains policies is given in table 1.

Cooperatives with a good fit between member characteristics and pricing policy are more likely to be successful than those without such a match. Katz (1997) suggests that successful cooperatives focus on a narrowly defined mission, avoid major investments in new technology, and have only limited differentiation. This implies that small, single-product cooperatives may be most successful. While Katz does not consider membership characteristics the combination of characteristics and pricing policy may be used to predict cooperative success. To examine the effects of membership-policy combinations on success, summary statistics are calculated for

various policy-characteristic combinations. We then create our second estimating equation,

which combines pricing policy and membership characteristics to explain cooperative success.

Membership characteristics are included, as they may influence success independent of the

influence they have on the cooperative's pricing policy.

$$
\begin{aligned}
success_i = {} & \alpha + \beta_1 age + \beta_2 patronage + \beta_3 mbrinc + \beta_4 misrc \\
& + \beta_5 retvote + \delta_1 coopage + \delta_4 federated + \delta_5 growth \\
& + \delta_6 tdr + \delta_7 mgtpenal + \delta_8 mgtex + \delta_9 voting \\
& + \delta_{10} tiedright + \delta_{11} pctnmbr + \omega \widehat{policy} + \sum_{m=1}^{3} \rho_m D_m + \varepsilon
\end{aligned}
\tag{2}
$$

Where $\beta's$ and $\delta's$ are as before, ω gives the influence of cooperative policy on success,

$\widehat{policy}$ is the fitted value from equation (1) and D_m are dummies controlling for the industry in

which the cooperative operates (with wool serving as the base).

Measuring cooperative success turns out to be problematic. Katz (1997) claims that

market-based measures are not appropriate, and uses the average product of labor as the measure.

However, he notes that labor productivity is highly correlated with measures such as return on

assets or return on equity. Because the number of cooperatives providing this financial

information is limited, alternative measures of success (both self-reported and objective) are used

as dependent variables in equation (2).

Table 1 presents a list of the variables used in the regressions. It also describes the pricing policies that cooperatives may pursue, as well as various measures of success. The expected effect of each of the independent variables on pricing policy is also indicated.

(Insert Table 1 here)

The Survey

Data were gathered using a survey of managers of processing cooperatives in four agricultural industries. Before mailing, the survey was pre-tested through interviews with cooperative managers in Utah. Once the suggested changes were made, the survey was sent to 553 cooperative managers throughout the United States. The sample was selected from the Directory of Farmer Cooperatives (USDA RBS, 1999). In order to increase the probability of surveying mainly marketing cooperatives, the survey was limited to cooperatives listing wool, fruits and vegetables, cotton and milk as their main products. This information was verified in the survey instrument by asking the cooperatives to list their main products.

The survey asked questions regarding the characteristics of the cooperative's members and the pricing strategies the cooperative followed. Managers were asked basic questions about how many members the cooperative had, how long the cooperative had been operating, what sales were in the last fiscal year, what share of (U.S.) industry output they handled and if there had been any structural change to the cooperative within the last five years. They were also asked to rate their cooperative's profitability, stability and member satisfaction on a scale of one to five. Member characteristic questions included the average income, age and length of membership as well as the cooperative's membership type (individual farmers, other cooperatives or a mix of the two). The survey also included questions designed to measure the degree of

freedom the cooperative had to set its own policies, by asking whether management can expel or impose monetary penalties on members, and which members are allowed to vote in cooperative elections. In addition to a direct question regarding pricing policy, the questionnaire asked about the cooperative's retains policy, if such policy existed. Finally, in order to assess the financial position of each cooperative, the survey asked for basic accounting ratios.

The survey was mailed out in March, 2002, using Dillman's total design method (Dillman (1978)). A postcard was sent two weeks after the initial survey, and a second survey was sent to non-respondents three weeks after that. Second mailings were also sent to those cooperatives with missing or incomplete data. 172 surveys were returned for a response rate of 31%. Of these, 145 contained useable data and are included in our sample. The unused responses were mainly notes informing us that the cooperative was out of business (13), was not a marketing cooperative (12), or that the manager did not wish to answer (2). Six questionnaires were returned as undeliverable.

Of our responses, 12% marketed wool, 30% marketed fruit and/or vegetables, 21% marketed cotton, and 37% marketed milk. The majority of useable responses came from California (24) followed by New York and Texas, both with 20 responses each. The majority of cooperatives from California marketed produce, while New York rerespondents mainly marketed milk, and Texas respondents all marketed cotton. The geographic dispersion of respondents was fairly good, with 31% coming from the West (WA, OR, MT, ID, WY, NV, CA, CO, UT, AK, HI), 18% from the Southwest (AZ, NM, TX, OK), 17% from the Midwest (IL, IN, MI, MO, OH, MN, SD, ND, NE, KS, IA, WI), 23% from the Northeast (ME, VT, NH, MD, DE, CT, MA, NJ, NY, PA, RI) and 10% from the Southeast (LA, AR, MS, KY, WV, VA, NC, SC, GA, AL, FL,

TN). Summary statistics for other questions are included in column 3 of Table 1.

The majority of cooperatives in our sample were small and centralized (membership consisted of individual farms, rather than other cooperatives). Over half made sales of less than \$5 million during their last fiscal year, and half had 69 or fewer members (the smallest respondent had 3 members). However, there are a few extremely large cooperatives (two respondents had 25,000 members) in the sample. Cooperatives range in age from 3 years old to 137 years old, and most have steady or decreasing membership.

Most members receive a relatively small amount of income from the cooperative. This cannot tell us whether members have off-farm income, however, and therefore does not directly correlate with the income distribution of members. Most members have patronized the cooperative for less than 20 years, which in some cases may be the entire length of time the cooperative has been in existence. Well over half of respondent cooperatives (93) have been in existence for 40 years or more, however.

Cooperative management has limited control over their members, as the majority of managers cannot expel or impose a monetary penalty on members. However, two-thirds of respondents require members to be present to vote, and over 80 percent do not allow retired members to vote. Slightly less than half of the sample (42%) offers a competitive initial price, with median retained earnings, consistent with cooperative profit maximization. Approximately 21% of respondents operate at cost, while 35% never take possession of member products. Approximately half (70) of respondents have an equity redemption plan in place, with revolving fund being by far the most popular.

As expected, most cooperative managers report a high degree of success in profitability,

stability and member satisfaction. The results are more mixed in indirect measures. Over half of respondents have not expanded in existing or new areas in the past five years, although most respondents have not shrunk during this period. This presents a picture of fairly stable operations among respondents in our sample.

Estimation and results

A binary policy variable was first created, coding policies which involved substantial retained earnings (maximizing profit and maximizing input prices) as one, and those which involved relatively little retained earnings (operating at cost, and paying members upon sale of the product) as zero. Given that very few cooperatives reported a low initial price with high retains (the pricing policy consistent with per-unit price maximization), using this new variable causes little information to be lost, while still enabling us to distinguish between longer and shorter-term strategies pursued by cooperatives. The new variable (*retstrat*) was then regressed on the regressors listed in (1), using a probit specification.

(Insert Table 2 here)

Initial parameter estimates are given in Column 1 of Table 2, with marginal effects reported in column 2. Significant predictors of the retained earnings policy the cooperative pursued include the percentage of young members (*page20*), the type of membership (*federate*), the presence of tradeable delivery rights (*tdr*), the source of member income (*misrc*), changes in membership (*growth*), the number of members in the cooperative (*mbrno*), the size of the cooperative's sales (*coopsale*), and the presence of delivery rights tied to investment (*tiedright*). Of these, *tdr*, *mbrno* and *tiedright* are positive. Cooperatives with large numbers of members with delivery rights tied to investment and tradeable delivery rights are more likely to pursue a

longer-term policy of maximizing profit or total price paid to members, rather than operating at cost. The negative sign on *growth* tells us that cooperatives with closed or increasing membership (coded as zero) are more likely to have retained earnings than those with steady or decreasing membership (coded as one). We see that member planning horizon (*tdr*), cooperative structure (*mbrno*), and cooperative control over members (*mbrstrur, tiedright*) tend to enable the cooperative to pursue longer-term pricing/retains policies. Cooperatives with younger members (*page20*) or members who receive the majority of their income from the cooperative (*misrc*) are less likely to retain earnings. As anticipated, members in the early stages of their career or who depend on the cooperative for a large percentage of their income tend to be associated with cooperatives with shorter-term strategies. We also see that centralized cooperatives (*federate*) are more likely to have retained earnings. This may be because members of centralized cooperatives are more committed to the cooperative.

Contrary to our prediction, larger cooperative sales decrease the likelihood of retained earnings. To examine this issue further, dummy variables were included for every level of cooperative sales in the regression reported in column 3 of Table 2. With this modification, none of the levels of *coopsales* remain significant. This suggests that treating this categorical variable in a continuous manner (as was done in the first regression) may be problematic. All previously significant variables remain significant and have the same sign (*tdr* becomes marginally insignificant with a p-value of 0.11). Once again, this supports the predictions made above. In addition to these variables, *mgtex*, a dummy variable for the management's right to expel members, and *pct110* the percentage of members who have belonged to the cooperative for ten years or less. These last two significant variables tell us that when management has the right to

expel members (*mgtex*), the cooperative is likely to pursue longer-term strategies. Member

commitment among new members (*pct110*) is likely higher, so that these cooperatives are more

likely to retain earnings for longer-term goals.

(Insert Table 3 here)

Table 3 describes the relationship between cooperative pricing policies and various

success measures. Looking at the bottom, we see that cooperatives which have limited retained

earnings also have higher average and median sales per member. When looking at individual

pricing strategies, we see that cooperatives that operate at cost (high initial price, limited retains)

have much larger average sales per member than all others, and that cooperatives which pay

members upon sale of their output have much larger median sales per member. It appears that

cooperatives which pay competitive or low initial prices also have lower sales per member.

Looking at the three alternative success measures presented in Table 3, we see that

cooperatives with some level of retained earnings are also more likely to expand into new areas.

Expanding in existing areas is much more common, as approximately half of all respondents

have done so, while only a third of cooperatives have expanded into new areas. Few of the

respondents have reduced their workforce in the past five years.

Next, we included the fitted policy variable ($\widehat{pstrat}$) into regressions with various

measures of cooperative success as the dependent variable.[3] Although several dependent

variables were used, none of these models fit the data well, so results will not be reported here,

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[3]Identification of the regression equation may be problematic when a fitted variable is included on the
right-hand-side with some of its explanatory variables. To overcome this problem, dummies were added to account
for industry effect, and ensure that the success regressions were identified. Additionally, results for all success
regressions change little when $\widehat{pstrat}$ is omitted.

although they are available upon request. The first dependent variable tried was sales per member. The only significant predictor of cooperative success is the percentage of members who have belonged to the cooperative for a long time (*pct3140*). In addition to insignificant regressors, the model is not a good predictor, as the F-test for model fit was not significant.

Because the first regression model seemed to fit the data poorly, regressions involving other success measures were performed. We next tried regressing three self-reported success measures on explanatory variables including fitted pricing policy. Dependent variables were the manager's report on how well the cooperative met its profitability goals (*profit*), how financially stable the cooperative was (*stable*) and how content members were with management (*content*). Not surprisingly, all three of these models are significant, and a significant relationship is found between some of the regressors and the dependent variable. The presence of tradeable delivery rights appears to increase the manager's belief in the cooperative's profitabiliy, while weakened management (*mgtpenal*) and a policy of limited retains ($\widehat{pstrat}$) increases the manager's

perception of the cooperative's financial stability.

Regressing self-reported variables on self-reported variables may be suspect, so three additional indirect success measures were also tried as dependent variables. These three dependent variables measure whether the cooperative has expanded in existing areas (*expand*), whether the cooperative has entered new areas (*newarea*), or permanently reduced its workforce (*redempno*) in the last five years. While these models give a slightly better fit, none of the log-likelihood tests is significant. Very few variables in any of these three regressions were significant. Cooperatives which tie delivery rights to investment (*tiedright*) are less likely to

have reduced their workforce in the past five years. This is not surprising, as these cooperatives have an ongoing source of funding, and are thus better equipped to maintain a steady workforce.

Finally, regressions using financial measures of success (return on assets and return on member equity) were considered. Many respondents did not include this data, and not enough observations were available to provide the necessary degrees of freedom to estimate the models.

Overall, the models explaining cooperative success are less compelling than those explaining the cooperative's pricing/retains strategy. While disappointing, the number and variety of measures used without significant results suggests that the regressors available in this data set may simply not be the key determinants of cooperative success. This leads one to wonder - if these variables are not related to cooperative success, what is? Alternatively, it may be that, as suggested by Katz (1997), cooperative success is difficult to measure. In that case, one is tempted to ask - if the measures available in this data set do not describe cooperative success, what does? Given the data available, it is not clear how these questions can be pursued in this study, although they are certainly interesting topics for additional research.

Conclusion

Cooperatives today face an increasingly challenging situation. Competition with investor-owned agribusinesses and the increasing size and sophistication of members combine to make cooperative decisions much more important. While many studies have considered the policies that cooperatives pursue, few have examined the influence of member characteristics and market conditions on these policies. Using a survey of marketing cooperatives, this study examines the relationship between member characteristics and the cooperative's pricing policy.

It appears that the data offers some support for the predictions regarding pricing policy

given above. Interestingly, the age and tenure of members seems to have no effect on the cooperative's pricing policy. This may be because coop members are often incorporated farms rather than individuals, and the membership goes with the farm instead of the individual. In the pricing policy regression equations, the presence of tradeable delivery rights tied to investment significantly increases the probability that the cooperative will have retained earnings. The results on cooperative size are mixed. Increased sales may reduce the likelihood of the cooperative having a longer-term pricing policy, but more members increases this probability. It will be important in future research to disentangle these two effects.

The second objective of this study is to explore the tie between member characteristics, pricing policies and cooperative success. It is posited that cooperatives with a good fit between characteristics and policies are more successful. Several measures of success are defined, and then regressed on characteristics of the membership and the pricing policy the cooperative uses. The regressors appear to explain only the self-reported measures of cooperative success. This may be due to problems in defining and measuring cooperative success, or to the many factors influencing success that are not included in the data set. However, given the number and variety of dependent variables used, it appears that determining which of these explanations is appropriate will not be possible with these data. However, these results do suggest that defining useful measures of cooperative success, and/or determining which factors best predict it would be an interesting future study.

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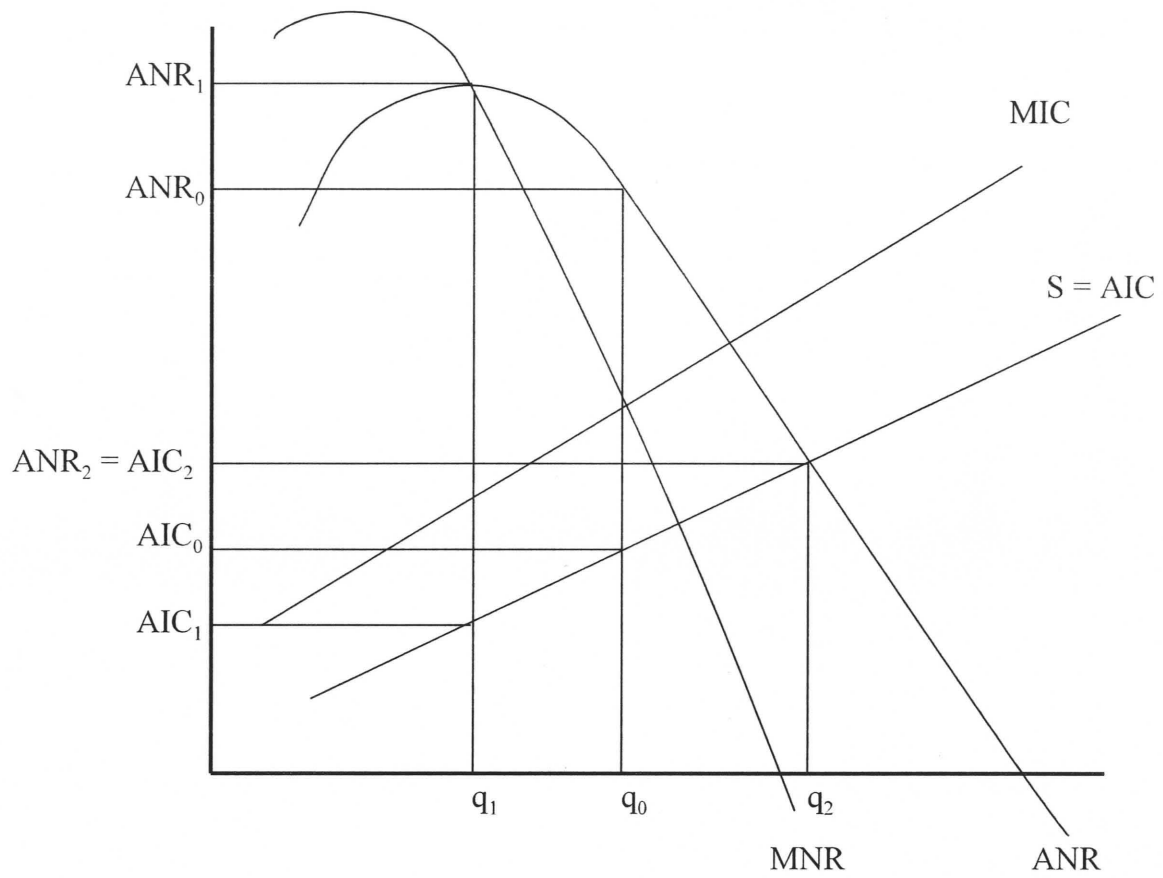
Figure 1 - Pricing/input purchase options for marketing cooperatives

Table 1: Summary Statistics

Item (**regression variable name**)	Effect on Pricing Policy	Response
Member Characteristics		
Age of Members (**page20**, **page31**, **page41**, **page51**, **page61**)	older - at cost	20-30 years = 5% 31-40 years = 17% 41-50 years = 30% 51-60 years = 32% 61-70 years = 32% over 70 years = 3%
Length of Patronage[4] (**pct110**, **pct1120**, **pct2130**, **pct3140**)	?	0-10 years = 34% 11-20 years = 36% 21-30 years = 23% 31-40 years = 10% more than 40 years = 15%
Percentage of Members Who Have Patronized the Cooperative its Entire Existence[5]	larger - max π or w	mean=21% median=0% mode=0%
Member Income from Cooperative (**mbrinc**)	larger - max π or w	less than $60,000 = 51% $60,000 to $119,999 = 17% $120,000 to $199,999 = 10% $200,000 to $499,999 = 11% $500,000 or more = 11%
Source of Majority of Member Income (**misrc**)	Co-op - max π or w	Cooperative = 54% Another Source = 35% No Response = 10%

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[4]Percentages for this and member age sum to over 100 because the average of each category was calculated.

[5]This variable was not included in the regressions because it is a linear combination of coopage and member length of patronage.

Item (**regression variable name**)	Effect on Pricing Policy	Response
Cooperative Structure/Characteristics		
Age of Cooperative (**coopage**)	older - max π or w	mean = 52 yr, median = 50 yr mode = 50 yr
Number of Members (**mbrno**)	?	mean = 613 median = 69 mode = 30
Total Sales Last Fiscal Year (**coopsale**)	?	less than $5 million = 53% $5 to $25 million = 23% $26 to $50 million = 6% $51 to $100 million = 8% $101 to $250 million = 3% more than $250 million = 7%
Cooperative Structure (**federated**)	federated - max π or w	federated = 8% mixed = 6% centralized = 86%
Changes in Membership (**growth**)	increasing, closed - max π or w	increasing = 22% decreasing = 36% steady = 39% closed = 3%
Presence of Tradeable Delivery Rights (**tdr**)	yes - max π or w	yes = 3% no = 97%
Cooperative Control over Members		
Can Management Expel Members (**mgtexp**)	yes - max π or w	yes = 39% no = 61%
Can Management Impose a Monetary Penalty on Members (**mgtpenal**)	yes - max π or w	yes = 35% no = 65%
Voting Restrictions (**voting**)	yes - max π or w	yes = 67% no = 33%
Retired Member Participation (**retvote**)	yes - at cost	yes = 16% no = 84%
Are Delivery Rights Tied to Investment (**tiedright**)	yes - max π or w	yes = 11% no = 77% no response = 12%
Percentage of Non-Member Business the Cooperative Handles (**pctnmbr**)	higher - max π or w	mean = 8% median = 0%

Item (**regression variable name**)	Effect on Pricing Policy	Response

Pricing Strategy and Success Measures

Item (**regression variable name**)	Effect on Pricing Policy	Response
Pricing Strategy	--	low initial, high retains = 2% competitive initial, median retains = 42% high initial, low retains = 21% full pymt at time of sale = 35%
Equity Redemption Plan[6]		revolving fund = 76% base capital = 14% percent of all equity = 6% redeemed to estate = 24% redeemed to age = 14% other = 6%
Co-op Success - Sales per Member		mean = $506,516 median = $93,750
Co-op Success - Profitability[7]		0 = 2% 1 = 8% 2 = 23% 3 = 39% 4 = 28%
Co-op Success - Financial Stability		0 = 1% 1 = 5% 2 = 15% 3 = 35% 4 = 44%
Co-op Success - Member Satisfaction		0 = 2% 1 = 1% 2 = 17% 3 = 48% 4 = 32%
Co-op Success - Expansion in Existing Areas		yes = 44% no = 56%
Co-op Success - Expansion to New Areas		yes = 25% no = 75%
Co-op Success - Reduced Workforce		yes = 29% no = 71%

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[6]Percentages are of those cooperatives with an equity redemption plan in place. (n=70) Sums to more than 100% because some cooperatives have more than one plan in place.

[7]The next three questions are self-reported. 0=poor to 4=very good.

Table 2: Probit regression: dependent variable = pricing/retains policy

Variable	retstrat	m. effect	sale dummies
intercept	-5.32	-1.78	-23.395
	(7.33)	(2.27)	(209943)
page20 - Percent of members age 20 to 30	-14.75†	-4.66*	-21.02†
	(8.42)	(2.45)	(11.87)
page31 - Percent of members age 31 to 40	3.64	1.15	4.41
	(6.13)	(1.91)	(7.77)
page41 - Percent of members age 41 to 50	-1.85	-.58	-4.4
	(6.11)	(1.93)	(7.91)
page51 - Percent of members age 51 to 60	3.73	1.18	9.25
	(6.45)	(2.01)	(8.47)
page61 - Percent of members age 61 to 70	-2.80	-.89	-7.41
	(8.07)	(2.53)	(10.97)
retvote - 1 if retired members are allowed to vote	-.28	-.09	-.07
	(.80)	(.25)	(.86)
federate - 1= federated or mixed, 0 = centralized	-2.47	-.78†	-2.75†
	(1.59)	(.46)	(1.67)
tdr - 2 = allowed, 1 = not allowed, 0 = membership is closed	1.17†	.37†	1.03
	(.66)	().2	(.66)
mincsrc - 1 if majority of member's income is from business with coop, 0 if not	-1.67*	-.53*	-1.99*
	(.86)	(.25)	(1.00)
growth - 1 if membership is increasing or closed, 0 if decreasing or steady	-1.33†	-.42†	-1.67†
	(.78)	(.24)	(.92)
mbrinc - categories of member income, 1=lowest to 5=highest	.32	.10	.27
	(.27)	(.08)	(.28)
mbrnoc - number of members divided into quintiles 1=smallest to 5=largest	1.93**	.61**	2.62**
	(.58)	(.15)	(.94)
coopsales - categories of coop yearly sales 1=lowest to 6=highest	-.92**	-.29**	--
	(.37)	(.09)	
csale1 - 1 = sales less than $5 million	--	--	10.37
			(209943)
csale2 - 1 = sales between $5 and $25 million	--	--	8.9
			(209943)
csale3 - 1 = sales between $26 and $50 million	--	--	5.37
			(209943)
csale4 - 1 = sales between $51 and $100 million	--	--	1.10
			(209943)
csale5# - 1 = sales between $101 and $250 million	--	--	--
csale6 - 1 = sales over $250 million	--	--	5.56
			(209943)

Variable	retstrat	m. effect	sale dummies
decage - Number of decades coop has been in existence	-.02 (.17)	-.005 (.05)	.09 (.20)
tiedright - 1 if delivery rights are tied to investment, 0 if not	5.66** (2.11)	1.79** (.57)	9.00** (3.58)
voting - 1 if members must be present to vote, 0 if not	.14 (.57)	.04 (.18)	-.08 (.71)
mgtexp - 1 if management can expel members, 0 if not	.69 (.76)	.22 (.24)	1.59† (.97)
mgtpenal - 1 if management can penalize members, 0 if not	-.69 (.76)	-.22 (.24)	-.79 (1.00)
pctnonmbr - Percentage of revenue from non-members	.27 (2.01)	.08 (.64)	-.13 (1.83)
pct110 - Percent of members with coop less than 10 years	4.41 (3.39)	1.39 (.99)	9.74* (4.97)
pct1120 - Percent of members with coop 11 to 20 years	-.45 (2.34)	-.14 (.74)	4.76 (3.94)
pct2130 - Percent of members with coop 21 to 30 years	-1.76 (2.37)	-.55 (.75)	.82 (2.9)
pct3140 - Percent of members with coop 31 to 40 years	-2.95 (3.54)	-.93 (1.15)	-.65 (4.02)
Restricted Ln Likelihood	-43.86	--	-43.86
Ln Likelihood	-21.75	--	-19.97
Percent Correctly Predicted	81%	--	84%

[#]csale5 is omitted from all regressions, as it perfectly predicts retstrat

Standard errors given in parentheses

† = significant at 10%   * = significant at 5%   **=significant at 1%

Table 3: Relationship Between Pricing/retains Strategies and Success

Pricing Strategy	Success Measure		Pricing Strategy	Success Measure	
	Expansion into new area			**Reduction in Workforce**	
	yes	no		yes	no
High initial price, limited retains	27% (7)	73% (19)	High initial price, limited retains	35% (9)	65% (17)
Payment upon sale of output	22% (10)	78% (36)	Payment upon sale of output	23% (11)	77% (36)
Low initial price, high retains	33% (1)	67% (2)	Low initial price, high retains	0%	100% (3)
Competitive initial price, median retains	28% (15)	72% (38)	Competitive initial price, median retains	32% (17)	68% (36)

Pricing Strategy	**Expansion in Existing Area**		Pricing Strategy	**Sales per Member**	
	yes	no		Average	Median
High initial price, limited retains	48% (12)	52% (13)			
Payment upon sale of output	47% (21)	53% (24)	High initial price, limited retains	925,472	83,333
Low initial price, high retains	67% (2)	33% (1)	Payment upon sale of output	522,373	208,333
Competitive initial price, median retains	42% (22)	58% (31)	Low initial price, high retains	152,985	96,154
			Competitive initial price, median retains	418,719	76,076

Retains Strategy	**Sales per Member**	
	Average	Median
Retains Kept	404,484	92,593
No Retains	669,987	116,923

The Effect of Membership Characteristics on Cooperative Pricing Policies and Success

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Abstract

Cooperatives are unique among agribusiness firms because their owners are also their customers. This dual nature of patrons means that maximizing profit is one of several optimal strategies the cooperative may pursue. Using a survey of marketing cooperative managers, we examine how membership characteristics and cooperative structure influence cooperative policies. We also study the relationship between member characteristics, cooperative policies and cooperative success. Longer member planning horizons and independent management make profit or price maximization more likely. Cooperative success does not appear systematically related to membership characteristics or cooperative structure. Evidently, cooperative success is not easily measured or explained. JEL Codes: L120, Q130, L200

Keywords: Cooperatives, Retained Earnings, Success

Introduction

Cooperatives face many challenges in today's agricultural market. They must compete horizontally with increasingly large investor-owned firms (IOFs) and often must sell their products in markets where only a few extremely large firms act as buyers. Both processing and supply cooperatives are called on to make ever larger investments in capital to serve their diverse member-owners. The size distribution of U.S. farms illustrates the difficulties cooperatives face in meeting the needs of a diverse membership while making business decisions necessary to remain competitive. The *1997 Census of Agriculture* reports that only 7% of all the farms in the United States produced over 70% of the value of agricultural products sold in 1997 while approximately 74% of all the farms in the U.S. produced only about 6.8% of the value of agricultural products sold the same year. Since many cooperatives need assured supplies to operate processing facilities efficiently they need to maintain the commitment of large farmers while still serving the needs of smaller producers.

Cooperatives have been successful because they have met the needs of their member-owners. In the past these needs were usually geography-specific and cooperatives were organized to market local products and/or provide agricultural inputs on a local basis. Because members were located in the same region, they were generally homogeneous and cooperative policies were easier to specify. As the structure of cooperatives has evolved to larger, less geographically dependent organizations, interest in issues of member commitment, control and governance has intensified. The characteristics of owner-members have also changed as commercial farm size has increased and sophisticated management systems have emerged. This has resulted in a more diverse (heterogeneous) membership within cooperatives. As a result, the