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# Cooperative Performance and Board of Director Characteristics: A Quantitative Investigation

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## I. Introduction

The literature on corporate governance has acknowledged that the recent rash of scandals has diminished investor confidence in corporate boards of directors who are charged with monitoring executive performance and representing the interests of shareholders (Kim and Nofsinger). In the aftermath of these incidents, investors and the exchanges are looking with renewed interest for ways to improve the accountability and effectiveness of corporate boards (Rauterkus).[1] By comparison, there has been little discussion of agricultural cooperative governance reform despite the fact that cooperatives operate and compete in the same business environment as public corporations and are guided by comparable internal control systems.

Similar to corporate boards, cooperative directors play an essential role in linking member/patrons' needs to management's actions. Both corporate and cooperative boards are charged with monitoring the performance of management, forming long-term strategic plans, evaluating proposals presented by management, and understanding financial and strategic actions undertaken by the firm. To function effectively in this capacity requires that directors have basic literacy in finance and have some comprehension of business strategy. For corporations whose boards are largely staffed by officers of other corporations, industry experts, firm management, and wealthy shareholders, meeting minimal director competency recommendations is not difficult (Benson and Hargraves). However, members of an agricultural cooperative board are more likely to be professionals in agricultural production management and industry leaders, neither of which is sufficient to prepare the individual for his/her role as a director (Lang, Staatz, Rhodes, Dunn et al.). As such, this feature of agricultural cooperative boards may be partially

[1] The exchanges mentioned above include the New York Stock Exchange (NYSE) and the National Association of Securities Dealers Automated Quotation (NASDAQ).

responsible for creating more severe governance problems than those experienced by corporate counterparts.

Thus, the goal of this paper is to gain a better understanding of the relationships between cooperative performance and board characteristics. A better comprehension of governance and performance dynamics may aide cooperatives in creating more effective boards. Previously, the cooperative governance literature has relied on qualitative data to recommend change (Keeling, Dunn et al., Lang). Often, the anecdotal findings of this research echo the econometrically supported conclusions found in the corporate governance literature. However, statistical methods have not been used to study how board characteristics affect agricultural cooperative performance. To fill the gap in the literature, the current research will use two data sets provided by the USDA-Rural Business and Cooperative Services Agency (RBS), data collected from a survey of cooperative top managers, econometric methods, and lessons learned from the corporate governance literature and the Rice Growers Association (RGA) case study to investigate the relationship between U.S. agricultural cooperative performance and board of directors' characteristics.

In support of this research goal, corporate and cooperative governance literature is reviewed and summarized in the next section. Next, the empirical framework is presented followed by analysis of the econometric results. Finally, this paper concludes with a discussion of our findings to date and planned extensions.

## II. Literature Review

Prior to recent incidents involving corporate fraud and other misdeeds, academics and professionals have investigated how board characteristics may influence corporate performance.

However, since the Enron scandal became public knowledge, a more immediate need to revitalize boards has been demonstrated (Kim and Nofsinger). With the goal of understanding the interaction between firm performance and board characteristics, the current empirical corporate governance literature has focused on determining an optimal board size and the ideal number of outside directors (Lipton and Lorsch, Jensen (1993), Gilson, Dehaene et al.). Anecdotal evidence suggests that research on board size and performance may be especially helpful in understanding performance issues of cooperatives.

When firm performance suffers, researchers have found that board size may increase or decrease, depending on the preferences of the existing board members. In the case of RGA, board size was decreased from 25 to 15 during a period of financial difficulty for the firm in 1986. On the other hand, Tri-Valley Growers (TVG) increased the size of their board from 11 to 13 when the cooperative underwent restructuring in the late 1990s to enhance performance (Hariyoga).

Several authors have attempted to recommend an optimal board size. Lipton and Lorsch determined that maximum board size should be 10, several directors smaller than the RGA or TVG boards. Lipton and Lorsch state that a number below 10 is more desirable, as a smaller board is less likely to be manipulated by the elected chairman of the board. An even smaller board size of 8 is recommended by Jensen (1993), who finds that larger boards have greater difficulty in reaching a quorum. This inability to make decisions may make the firm less able to take pre-emptive action to avoid failure (Jensen 1993). Lang reports that cooperative leaders believe smaller boards may make it possible for members to be more selective in voting for directors and lead to greater accountability, less anonymity, and more efficient board meetings.

In Reynolds' 2003 survey of 437 cooperative boards of directors, a board size of 7 was most commonly observed. Comparatively, Hanson and Song observed that the average board size at American corporations in the 1990s is slightly less than 12, down from an average of over 13 in the 1980s. Thus it is clear that different board sizes characterize the business environment. However, little information on how board size and performance are related can be gleaned from the literature. This current research hopes to fill a gap in the governance literature by measuring how cooperative board size and firm performance are related.

In addition to size, firm stakeholders must determine how to comprise their boards. Hanson and Song determine that the current corporate scandals may be influencing boards to act more independently and take on more outsiders. Recently, some cooperative managers have expressed interest in the use of outside directors, while other cooperatives have already designated board positions for "non-member" directors (Reynolds).[2] The employment of full-time professional board members is also recommended by Gilson. Potentially, these expert directors could work for several firms and when boards are comprised entirely of professional directors, optimal board size may be quite small (Gilson).

Past research has arrived at different conclusions when evaluating the relationship between firm performance and the proportion of external (outside) directors on the board.[3] Dehaene et al. find that return on equity increases with the number of external board members. Baysinger and Butler also note that firms with non-executive or outsider dominated boards fare financial better than firms where insiders dominate. However, Vance and Pfeffer state that corporate performance may actually worsen when the board includes a large number of outside

[2] Eighteen of 437 cooperative boards stated that they had at least one outside or non-member director. Four of the eighteen reported having more than one board position designated for outside directors.
[3] External or outside directors are those directors who are neither members of management nor shareholders of the firm they are governing. Frequently, these are individuals hired to sit on the board for their financial or political expertise.

directors. Similarly, Klein determined that having fewer outside directors is positively associated with better performance measures. If finance and investment committees are comprised primarily of insiders, Klein also finds that accounting and stock market performance is better. Some of the cooperatives in our data set currently include outside directors on their board, thus we will use these observations to determine if firms that hire outside directors perform better than comparable cooperatives that do not.

If firm performance is poor, firms may be more or less inclined to hire outside directors. For example, when corporations are performing poorly, Dehaene et al. report that boards are more likely to take on outside directors. Similarly, Franks et al. find evidence that board composition changes more frequently in poorly performing companies and changes occur more often in companies whose boards contain many outsiders. These findings imply that corporate boards of directors and/or management believe that outside directors have the potential to improve their firms. However, the literature discussed in the previous section does not always support this belief. Some cooperative leaders also believe that outside board members are beneficial to firm and board performance despite having no figures to corroborate this belief (Lang).[4] These leaders may be influenced by cooperative governance studies such as those by Dunn et al., Lang, and others that recommend the inclusion of outside directors on cooperative boards, without quantifying that outside directors are indeed beneficial. The current research will extend the cooperative governance literature through quantification of firm benefits or costs from use of outside directors.

[4] Cooperative experts who participated in Lang's 2000 study included cooperative managers, directors, researchers, extension specialists, lenders, and accountants.

Participants in the Dunn et al. study, voiced concern that owner-directors too often make decisions based on internal politics rather than sound economics.[5] These participants believed that, on occasion, cooperative directors may be motivated to make decisions that benefit the individual at the expense of the cooperative. Recent corporate scandals have revealed instances in which directors have, in fact, violated the trust of members and shareholders. Perhaps the most damaging misrepresentations by board members occur when the "duty of care" is not exercised. The duty of care requires directors to act in good faith, exercise prudence, apply their best judgment, and implicitly exercise due diligence. In the 2002 Power's Report, Enron's board has been accused of carrying out its duties in only a "cursory" manner. Similarly, several former RGA managers stated that the board acted passively and generally supported the recommendations of management with limited criticism.[6] Rhodes finds that a board's failure to adequately oversee and disciple management, such as in the RGA case, may stem from cooperative free-rider problems:

> "Seldom does any cooperative member (including board members) have an economic self-interest for trying to discipline management. His potential costs exceed his potential benefits. While all members together may have an economic incentive, the rational choice is for each individual to hope the others make the effort while he reaps the benefits." p.223

One force working against board free-ridership is that board members typically wish to remain on the board. Biggs finds that 87.3% of directors would be at least "quite pleased" to be reelected or reappointed for another term of office. Staaz finds that reputations do matter in cooperatives as uncooperative members, and conceivably directors, may be expelled or penalized for lack participation. To facilitate their reappointment, board members need to create a

[5] Owner-Directors are those directors who are also members of the cooperative. Owner-directors may also be referred to as inside-directors.

[6] This statement is based on discussions that took place during a meeting of former RGA management and cooperative experts on August 2001.

reputation for effective governance. As such, most board members will have incentives to oversee management to some degree.

Despite having partial incentives to evaluate management, past research has found that boards still fail to satisfactorily carry out this task. Lang finds evidence that this failure may be due to directors lacking confidence in evaluating the CEO and other top management, in addition to being uncomfortable offering minority viewpoints and scrutinizing weaknesses of the cooperative. Directors may lack confidence in performing their monitoring duties, in part, due to confusion over what metric to use when evaluating managers (Richards et al.). The objective of cooperatives is not necessarily to generate profit, thus it is recommended that directors evaluate the performance of cooperatives using other methods that may include valuation of non-market benefits (Sexton and Iskow; Parliament, Lerman, and Fulton). If cooperative directors are unable to design compensation schemes that align the objectives of management with those of the board, principal-agent problems may arise that may inhibit the cooperative's success (Staatz).

Perhaps in recognition of the need to evaluate both individual and relative cooperative performance, several cooperative performance measurement methods have been developed. The National Cooperative Bank (NCB) ranks cooperatives solely on the basis of revenue.[7] Accordingly, the top cooperative is the firm earning the most revenue in the previous fiscal year.[8] Other work by Parliament, Lerman, and Fulton (PLF), Royer (1990, 1991), Chen, Babb and Boynton, and Schradar et al. use traditional financial ratio analysis to evaluate relative cooperative performance. However, Sexton and Iskow argue that cooperative ratio analysis may be biased and lacks a solid foundation in economic theory. Specifically, simple ratio analysis fails to account for the influence of unknown levels of public support and the value of non-

[7] Purchasing cooperatives are not included on the NCB's top 100 cooperatives list.
[8] The top cooperative in 2003 is CHS Cooperatives, formerly CENEX Harvest States Cooperatives.

market benefits provided by the cooperative. Therefore, Sexton and Iskow encourage the use of cooperative technical, allocative, and scale or price efficiency measures performance as opposed to financial ratios.

Another limitation of traditional financial ratio analysis is that the performance of a vertically integrated entity is evaluated solely at the operating stage. Efficiency measures overcome this constraint and are able to portray the performance of the cooperative entity as a whole. This improvement makes efficiency measures an appealing alternative to ratio analysis; however, large data demands make these measures challenging to estimate. To determine cooperative efficiency requires data that is generally confidential in nature on input quantities and costs, and output(s) (Sexton and Iskow). In addition, evaluation of cooperative relative efficiency requires data from the rare industry that is comprised of comparable cooperatives and investor-owned-firms (IOFs). These limitations of the efficiency-based evaluation method make it infeasible to carry out in the present study.

Other researchers have been faced with similar data limitations and a desire to measure cooperative performance. In these instances, many authors have chosen to utilize ratio-based performance measures (Parliament, Lerman, and Fulton (PLF), Royer (1990, 1991), Chen, Babb and Boynton, and Schradar et al.). Noting both the superiority of efficiency measures and the precedent for using ratio analysis when data limitations exist, we proceed with the measurement of firm performance via the calculation of various financial ratios. However, efforts have been made to find widely accepted performance measures that are, at minimum, hypothesized to be correlated with firm efficiency.

## III. Empirical Framework

Past research has used statistical methods to test for relationships between particular corporate governance features and firm performance. One such study by Dehaene et al. is of particular interest, as the relationship between several board characteristics and the performance of 122 Belgium corporations was simultaneously estimated. Given similarities between the goals of the Dehaene et al. corporate governance study and objectives of the present work on cooperative governance, the Dehaene et al. model serves as a point of departure.

Two data sets used in this study were provided by the USDA-RBS. The first contains information such as board size, number of outside directors, limited financial data, and cooperative type from a 2003 survey of 437 cooperatives by Reynolds. The second data set combines 2003 cooperative financial information from the National Bank for Cooperative's Top 100 Coops data set and other survey. A third set of survey data was collected between December 2004 and March 2005. This UC Davis-based survey solicited information from top managers at cooperatives who responded to the initial Reynolds's board of director survey. Top managers from 40.2% or 176 of the sampled cooperatives responded to our request for information on their educational and managerial background. Data obtained from this study were then utilized to create a broad-based index of cooperative manager skill that serves as a proxy for top manager ability in our regressions.

To date, financial, governance, and managerial information has been combined into one data set for 21 of the 176 cooperatives in our study. When data for all 176 cooperatives has been combined, the econometric investigation herein will be repeated and our analyses updated to reflect changes. However, the present sub-sample allows us the opportunity to explore the empirical models and present some preliminary results.

In Dehaene et al. and Platt and Platt, performance ratios were transformed by industry mean ratios to control for industry characteristics. According to Royer (1990), use of industry median ratios limits the influence of outliers when transforming ratios. Financial ratios used in the current research have been transformed as follows:

$$Y_{j,a} = \frac{Y_j}{Y_{m,j}} \tag{1}$$

where $Y_{j,a}$ represent the performance variable of choice, *j* denotes an individual cooperative, *a* indicates sector, and *m* designates median. Industry sector medians were obtained from the 2003-2004 Study of Annual Statements and Financial Ratio Benchmarks (SASFRB) by the Risk Management Association. To ensure consistency with our board of director and financial data sets, industry median ratios for 2003 were obtained. Co-op's in our study were then matched with their corresponding six-digit North American Industry Classification System (NAICS) codes. The SASFRB provided medians for each cooperative's six-digit industry in all but one case. Because it was not possible to locate the exact six-digit industry median measure from the SASFRB or other sources, this observation was dropped from our sub-sample data set leaving a total of 20 useable observations.

Following Dehaene et al., dependent variables are related to board characteristics. However, whereas Dehaene et al. used return on assets, profits, and equity to measure corporate performance, our dependent variables include the current ratio (*CA/CL)*, earning before interest and taxes divided by interest *(EBIT/I)*, the total asset turnover ratio (*S/TA*), the inventory turnover ratio (*INV*), and the accounts receivable turnover ratio (*ART*). A number of classical financial measures are available for the cooperatives in our study, however, it is necessary to control for industry effects across cooperatives thus only measures for which industry medians were also available are used.

Several of our financial measures are calculated using firm assets. When firms are older they will have more fully depreciated plants and equipment resulting in a lower asset base, thus we expect older firms to have higher *CA/CL*, *ART*, *S/TA* and ratios (Harrington). Older firms may also have less sophisticated equipment or facilities than newer firms, possibly increasing the relative cost of good sold (COGS) and hence the inventory turnover ratio. If COGS is high then if follows that earnings may be relatively smaller at an older firm, resulting in a lower *EBIT/I* compared to a younger firm with low COGS. In light of the above examples, firm age (*AGE*) is included as an explanatory variable in all regressions.

A high inventory turnover ratio generally indicates that a company is using its financial assets efficiently by maintaining low inventories (Harrington). However, a difference in the type of industry in which a firm participates has implications for how high an inventory turnover ratio is expected to be. For example, the nature of the airline industry production process makes it difficult to achieve high inventory turnover thus we expect to observe low inventory turnover ratios (Harrington). On the other hand, it is expected that agricultural firms, particularly those that market highly perishable goods, will have high inventory turnover ratios. The cooperatives in our sub-sample produce a diverse range of output, making it necessary to control for product perishability. Following Krider and Weinberg, who describe items in a convenience store as either perishable or non-perishable, we utilize a dummy variable, *PER*, where *PER*=1 when the cooperative's primary output is perishable and 0 otherwise.

In our small sub-sample, only farm supply co-op's are found to have primarily non-perishable output. As such, the perishability variable is a *de facto* dummy variable for farm supply cooperatives. Fourteen of the 20 observations are farm supply, thus the *PER* dummy variable is included in each regression to allow us to determine if farm supply cooperatives behave differently than the other six co-ops in our sample.

In addition to the variables described above, other right hand side variables include the difference (*DIF)* between the total number of board members at a cooperative (*TOTAL)* and the sub-sample average, the difference variable squared (*DIFSQ)*, cooperative type (*TYPE*), and an instrumental variable that accounts for the influence of CEO ability (*SKILL*).[9] The instrumental variable *SKILL* is an index that will serve as proxy for the unobserved CEO ability and is constructed using observable variables including rank of school(s) the top manager attended, degree(s) earned, number of years of cooperative and total management experience, and whether and how often the individual attends management training seminars. Inclusion of this proxy measure in the regression alleviates bias that likely exists in the variable's absence. The current data set does not include any outside board members (*OUT)*, thus we leave investigation of their influence on performance for a later date.

The individual regression equations used to test industry-adjusted performance measures against board characteristics and cooperative-specific variables will take the following form:

$$Y_{aj} = \alpha + \beta_1(DIF_{aj}) + \beta_2(DIFSQ_{aj}) + \beta_3(TYPE_{aj}) + \beta_4(SKILL_{aj}) + \beta_5(AGE_{aj}) + \beta_6(PER_{aj}) + \varepsilon_{aj} \quad (2)$$

where $Y_{aj}$ is the performance variable of choice and the subscripts represent sector *a* and cooperative identification number *j*. Board size ($TOTAL_{aj}$) is treated as exogenous. Equation (2) was estimated by ordinary least squares.

## IV. Empirical Analysis

Simple linear regressions were used by Dehaene et al. to investigate the relationship between ROE and ROA performance measures and board size. In both regressions, the authors reject the hypothesis that board size and corporate performance are related. Rauterkus appeals to Jensen in her argument that an

[9] Observations of a cooperative having more than one outside director are very rare in the Reynold's data set. Thus, in subsequent versions of this paper we will follow Brunello et al. and Kang and Shivdasani in using a dummy variable to indicate the presence of an outside director.

ideal board size is eight. Using this ideal, the hypothesis is tested that boards of directors with more than eight members are more likely to be associated with firms that file for Chapter 11 restructuring. Logistic regression analysis finds evidence to support the hypothesis that firms with boards larger than 8 are more likely file for Chapter 11 restructuring. The above studies present somewhat disparate results about the relation of board size and performance of firms and do not offer much guidance to cooperative leaders, particularly as they do not account for the potentially non-linear relationship between board size and performance. Thus in order to determine how the difference between an individual cooperative's board size and the sample average influences cooperatives' relative performance and to investigate the curvature properties of the relationship, the following hypothesis is tested:

> *$HO_1$: Cooperatives with above average size boards, that is, boards with more than 12.9 members are more likely to perform below industry average level.*[10]

Keeping in mind that the *DIF* variable is calculated as the total number of directors at a cooperative less the sample average, if the coefficient on the *DIF* variable is positive and significant we reject $HO_1$.

The estimation results are summarized in Appendix Table 1. The *DIF* coefficient is significant in the *EBIT/I* and *S/TA* regressions. The coefficient has a positive sign indicating that an additional board member may increase the size of both ratios. For the *EBIT/I* case, a high ratio may indicate that a borrower would have little difficulty meeting the interest obligations of a loan, thus an additional board member is found to increase the co-op's ability to take on additional debt. The *EBIT/I* results show that *DIFSQR* is negative and significant. This indicates that additional board members benefit the cooperative but at a decreasing rate. However, the magnitude of the *DIFSQR* coefficient is quite small relative to the *DIF* coefficient thus we conclude that additional board members are associated with net increased performance

[10] The "average" that will be used is based on the average board size identified in the sub-sample of the Reynolds data set.

in the *EBIT/I* regression. It should be noted that heteroskedasticity in the *EBIT/I* regressions was corrected with White standard error to produce robust estimates.

Similar to *EBIT/*I, positive firm performance is associated with higher *S/TA* ratios. Specifically, the *S/TA* ratio generally measures a firm's ability to generate sales in relation to total assets. As such, the higher sales are relative to total assets, the more efficiently a co-op is using its fixed, intangible, cash, and other assets. Finding a positive and significant *DIF* coefficient in the *S/TA* regression indicates that additional directors may result in improved co-op performance. The *DIFSQR* coefficient is not found to be significant in this case thus we cannot infer whether the marginal benefit of additional directors is decreasing.

Contrary to our *a priori* beliefs and findings from the corporate governance literature that above-average size board, or in our sub-sample boards larger than 12.9 members, are associated with decreased firm performance, our small sample results suggest that, in fact, additional directors may improve a co-op's financial well-being. Given the weak significance of our coefficients and our small sample size, more testing is needed before these results can be considered conclusive.

In three of the five regressions the *PER* or farm-supply dummy coefficient was found to be negative and significant. This indicate that farm supply cooperatives do behave differently than the other cooperative in our sample and are generally associated with smaller ratios. Since in all cases, a higher ratio is associated with stronger firm performance, it may be inferred that farm supply cooperatives have weaker financial performance. Interestingly, the average size of the farm supply boards in our sub-sample is 8.71 compared to 21.29 of the non-farm supply cooperatives also in our sub-sample. This anecdotal evidence provides some support for the notion that larger board increase co-op financial performance. However, we again stress the

preliminary nature of these results. Further research is necessary to investigate the validity of these findings.

## V. Conclusions and Extensions

In the wake of corporate failures attributed to poor governance and the closure of several large co-ops, our research aims to investigate how board characteristics may contribute to firm performance. In order to provide quantitatively-based advice to struggling cooperatives, econometric methods were used to estimate statistical relationships between five measures of financial health, board size, and co-op specific variables for a small sample of co-ops. The results of our preliminary investigation provide weak evidence that performance as measured by *EBIT/I* and *S/TA* improved with board size. This result, if confirmed for the full sample, is contrary to popular views among co-op experts about board size. Controlling for industry effects, we also find that non-farm supply co-ops perform relatively better than farm supply types despite having larger average board sizes.

The next research step is to estimate the model using the full 176 observations of cooperative financial measurers, board characteristics, and top manager skill. This data set includes observations of outside directors which will allows us to test whether outside directors influence co-op performance. In examining a larger number of cooperatives we hope to obtain more conclusive results that may then be used to prescribe governance changes.

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## VII. Appendix

| Table 1: Regression Results | | | | | |
|---|---|---|---|---|---|
| | Dependent Cooperative Performance Variable | | | | |
| | Current Ratio | EBIT/Interest[△] | Total Asset Turnover | Inventory Turnover | Accounts Receivable |
| *DIF* | -.00148 (-0.09) | .8718385 (1.38)** | .0440842 (2.13)* | .0508182 (0.55) | .1029545 (1.09) |
| *DIFSQR* | .0002599 (0.24) | -.0575814 (-1.35)** | -.005174 (-0.37) | -.0025036 (-0.40) | -.0047499 (-0.75) |
| *AGE* | -000.1497 (-0.06) | .0070262 (0.24) | -.0074858 (-2.34)* | .0029973 (0.21) | -.0137126 (-0.94) |
| *PER* | -.0023809 (-0.01) | -6.415002 (-1.46)** | -.6272847 (-2.24)* | -.5714121 (-0.46) | -1.81487 (-1.43)** |
| *TYPE* | -.0028759 (-0.17) | -.2100412 (-0.98) | -.0069599 (-0.33) | .0600161 (0.63) | -.0653932 (-0.67) |
| *SKILL* | .0038026 (0.68) | .004922 (0.08) | .004404 (0.62) | 0.20396 (0.64) | -.0326353 (-1.01) |
| *CONST* | .7549082 (1.87)* | 7.366349 (1.30) | 1.425102 (2.78)* | .0224125 (0.01) | 5.155622 (2.21)* |
| $R^2$ | .1098 | .3801 | .7089 | .1445 | .2586 |
| *Breuch-Pagan P-value* | 0.1106 | 0.000 | 0.4153 | 0.3309 | 0.5183 |
| T-stats in parentheses: *indicates significance at the 10% or higher level **indicates significance at the 20% level | | | | | |
| [△]EBIT/Interest Regression run with White-adjusted standard errors to obtain robust coefficient estimates | | | | | |