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Impact of Board Structure and Process on Cooperative Performance

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*Selected Paper prepared for presentation at the Agricultural & Applied Economics
Association's 2013 AAEA & CAES Joint Annual Meeting, Washington, DC, August 4-6,
2013.*

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Abstract

Limited inquiry into cooperative governance and performance suggests that best practices from corporate governance literature may not apply uniformly to cooperatives. The rarely addressed issue of endogeneity limits confidence in recommendations for corporations and cooperatives alike. By accounting for the most commonly recognized sources of endogeneity, expectations of better performance by larger cooperatives with smaller boards are confirmed, while mixed evidence is obtained on effects of seating outside experts on the board and the board's share of equity. A comprehensive understanding of implications of governance choices requires consideration of trade-offs between financial performance and effectively serving other needs of patron-members.

Key words: Boards of directors, Cooperatives, Corporate governance, Endogeneity, Performance

Disentangling the Endogeneity of Cooperative Governance and Performance

Introduction

Extensive research has been conducted on the relation between corporate governance and financial performance of investor-owned firms. However, the resulting evidence is inconclusive on some points (Hermalin and Weisbach, 2003) and the extent to which the findings apply to cooperatives is unclear (Caswell, 1989). As the function of cooperatives is distinct from investor-owned firms (Babcock, 1935; Nourse, 1942), the optimal structure and processes of cooperative boards may differ from corporate boards.¹ While best practices derived in the context of investor-owned firms may inform cooperative governance, it is not clear that identical structures and processes lead to exemplary performance in both models. A further and often neglected issue complicating empirical inquiry into these matters is that, “almost all the variables of interest are endogenous” (Hermalin and Weisbach, 2003). Corporate governance research has only recently attempted to account for endogeneity with various simultaneous equation and panel data techniques (Bhagat and Black, 2002; Pham, et al., 2011; Renders and Gaeremynck, 2006; Wintoki, et al., 2012), and up to this point, existing studies on the governance of cooperatives have lacked adequate data to address the issue (Burress, et al., 2011; Burress, et al., 2012).

This article seeks to inform governance recommendations specific to cooperatives. We use a unique combination of survey data and multiple years of accounting data to investigate the effects of past cooperative performance on board structure and processes and the effects of these variables on current and subsequent performance, thereby accounting for endogeneity using three stage least squares estimation. The U.S. Department of Agriculture (USDA) Cooperative Statistics database provides measures of financial performance—return on assets (*ROA*), return on equity (*ROE*), and extra-value index (*EVI*). Information on board structure and processes are

obtained from a 2010 survey of board chairs for the top 1,000 U.S. cooperatives, which constitute over 90% of U.S. agricultural cooperative business volume. In addition to financial performance, factor analytic measures of cooperative performance derived from survey responses are considered, because cooperative boards are tasked with maximizing patronage returns to members, rather than profits for stockholders (Chaddad, 2001; Liebrand, 2007; Ling and Liebrand, 1998). Results from this research inform actions cooperatives may consider to enhance governance and performance.

Literature & Hypotheses

Hermalin and Weisbach (2003) survey much of the research on corporate governance and chronicle early attempts to address endogeneity in the area. Noting that this line of study has advanced predominately through empirically (i.e., data) driven, as opposed to theory driven, research, the authors summarize the now widely recognized endogenous relationships in the empirical literature with the following system of equations:

$$(1) \quad p_{t+s} = \beta a_t + \eta_t$$

$$(2) \quad a_{t+s} = \phi c_t + \varepsilon_t$$

$$(3) \quad c_{t+s} = \mu p_t + \zeta_t$$

where p denotes performance (e.g., profits), a denotes an action of a decision maker (e.g., board dismissal of CEO), c denotes characteristics of decision makers (e.g., board independence, CEO tenure), t indexes time ($s > 0$), β , ϕ , and μ are parameters, and η , ε , and ζ represent residual errors. As observed by Hermalin and Weisbach (2003), most empirical studies directly estimate impacts of characteristics on performance, essentially substituting equation (2) into (1). The key point here, however, is that the relationships in equation (3) typically are not taken into account.

Based on their review, Hermalin and Weisbach (2003) identify a number of empirical regularities. First, measures of board composition (i.e., inside vs. outside members) meant to indicate board independence appears unrelated to firm performance, and firms with smaller boards tend to perform better. Second, board actions reflect board characteristics, as smaller boards with more outside directors make better decisions with respect to executive compensation and CEO replacement, for instance. Finally, bargaining power and turnover of CEOs are sensitive to firm performance and these factors appear to impact board characteristics such as size and composition. This work, as well as more recent research accounting for endogeneity of corporate governance (Bhagat and Black, 2002; Pham, et al., 2011; Renders and Gaeremynck, 2006; Wintoki, et al., 2012), is discussed below along with the sparse work on cooperative governance (Burress, et al., 2011; Burress, et al., 2012). Testable hypotheses are developed based on this body of work and predominant theories in corporate governance research, e.g., agency, stewardship, and resource dependency theories (Hung, 1998; Zahra and Pearce II, 1989).

Independence

According to Hermalin and Weisbach (2003), the most widely discussed question about boards is whether including more outside directors improves corporate performance. From an agency perspective, a primary role of the board is to monitor the action of agents (i.e., management) and limit their ability to expropriate residual claims through self-dealing (Fama and Jensen, 1983). In particular, scholars suggest the board's primary responsibility is choosing, monitoring, and if necessary, replacing the CEO (Mace, 1986; Vancil, 1987). Employee directors (insiders) may be ill-suited for such a role due to managements' influence on promotion and tenure decisions, whereas outside (non-employee, non-affiliated) directors are better positioned to reduce

managerial opportunism, thereby improving performance. Outside directors seek to signal their status as expert decision agents to external markets, and thus, have greater incentive to monitor agents (Fama and Jensen, 1983). Empirically, contemporaneous correlations are often consistent with these points (Hermalin and Weisbach, 1991; Mehran, 1995), but through the lens of more sophisticated modelling procedures controlling for endogeneity support is lacking (Bhagat and Black, 2002; Pham, et al., 2011; Wintoki, et al., 2012).

In cooperatives, in particular, there may still be reason to believe that the presence of outside directors enhances firm performance. In cooperatives, directors are often user members, chosen democratically for representational purposes (Cornforth, 2004). These individuals often possess much more expertise in production agriculture than in downstream industry activities. Hence, addition of outside directors with such expertise and knowledge of the operation of cooperative businesses may enhance performance. Therefore, we hypothesize:

Hypothesis 1. The presence of outside directors brings additional industry expertise and knowledge of inner-workings of the cooperative form, thereby improving performance.

Board Size

Efforts to determine optimal board size focus on tradeoffs between further insights and decision making capabilities afforded by additional directors and increasing transaction costs of involving more directors in decision making (Buchanan and Tullock, 1962). According to Hermalin and Weisbach's (2003) review of early corporate governance literature, "one of the most consistent empirical relationships regarding boards of directors is that board size is negatively related to firm profitability". The evidence is consistent with agency theorists' assertion that smaller boards, as more effective monitors, enhance performance (Jensen, 2012; Yermack, 1996). These

claims are supported by theories of collective action and agent modeling (Klimek, et al., 2009; Olson and Olson, 1965). Large boards also may allow little time for each director to voice opinions, hindering coordination and communication and resulting in slow decision making or inaction, and may lead to diffusion of responsibility, instigating second order free riding (Dalton, et al., 1999; Eisenberg, et al., 1998; Lipton and Lorsch, 1992; Poteete and Ostrom, 2004; Yamagishi, 1986).

Hypothesis 2a. Smaller boards, as more effective monitors, improve performance.

However, cooperatives may benefit from having relatively larger boards to perform representational and legitimizing democratic functions. Cooperatives are dependent upon patron-members for competitive performance. Resource dependency theory offers a contingency model, where firms that are highly dependent on external actors benefit from larger networks and greater access to information afforded by larger boards (Zahra and Pearce II, 1989).² Thus, co-opting board members representative of the patron group may allow cooperatives to reduce external dependency and gain valuable patron information. To successfully manage diverse patron-cooperative interdependencies, cooperative boards may require a larger, representational body.

Hypothesis 2b. Performance is enhanced by a greater number of directors who act as channels for communication and representation.

Board Equity Ownership

Directors with significant equity in the organization, like other large shareholders, possess strong incentives to actively monitor management, enhance their knowledge of firm operations, and become involved in firm decision making (Daily and Dalton, 1997; Kosnik, 1990; Shleifer and

Vishny, 1997). Such directors are more likely to make value-maximizing decisions because they bear the full wealth effects of their choices. With diffuse ownership, small stockholders may not have adequate financial stake to justify costly monitoring activities, making them prone to free ride on efforts of larger shareholders (Shleifer and Vishny, 1986). The convergence-of-interest hypothesis suggests directors perform better the greater their ownership stake (Jensen and Meckling, 1976; Jensen and Warner, 1988; Morck, et al., 1988).

Hypothesis 3. Directors with higher levels of equity capital are more active monitors, improving performance.

Diversity (Gender)

Agency studies suggest demographic similarity between the board and CEO results in more generous CEO compensation in investor-owned firms (Westphal and Zajac, 1995). As such, scholars suggest board diversity enhances vigilance in monitoring of management (Carter, et al., 2003). In addition, proponents argue board diversity promotes understanding of diversity in customer markets, increases healthy debate leading to creative problem-solving, and decreases turnover and absenteeism among employees by signaling advancement opportunities (Carter, et al., 2003; Cox and Blake, 1991; Hillman, et al., 2007; Robinson and Dechant, 1997). Empirical studies find a positive correlation between board diversity and corporate performance (Carter, et al., 2003; Erhardt, et al., 2003). Thus, firms with consumer-driven strategies may improve performance by seating board members who can contribute information regarding preferences of relevant consumer groups, including women and minorities.

Hypothesis 4a. Board diversity facilitates greater understanding of the marketplace and greater problem-solving ability, improving performance.

However, conflicting results call diversity arguments into question. Rose (2007) found no correlation between board diversity and corporate performance, while Bøhren and Strøm (2007) found a negative correlation. Diversity may contribute to clashes among directors that lead to fragmented boards delaying the decision making processes (Carter, et al., 2003; Hillman, et al., 2007). Potential benefits may not materialize if token women or minorities are not able to gain influence. Diverse directors may also be assimilated into existing board culture (Rose, 2007).

In a study of Australian agricultural boards, Alston and Wilkinson (1998) found 78% of board chairs viewed their clientele as predominantly male. In such situations, gender diversity may not further understanding of client's needs or enhance representation. From a cooperative perspective, member-patrons may rely on homophily to select representatives. Predominantly male patrons may view communication as best facilitated by directors with whom they have a strong rapport. If a primary role of cooperative boards is to communicate with and represent member-patrons, demographically homogenous boards may improve performance.

Hypothesis 4b. Board diversity introduces heterogeneity in preferences non-representative of member-patron interests, negatively impacting performance.

CEO Tenure

Scholars suggest that managerial experience and firm-specific expertise that comes with experience at a particular firm may lead to better decision making and direction of the firm (Carpenter and Westphal, 2001; Taylor, 1975). Therefore, we hypothesize:

Hypothesis 5. Longer CEO tenure leads to better firm performance.

Yet, much of the most widely recognized endogeneity issues surrounding corporate governance research involves the power struggle between the board and the CEO and the impact of past performance on the relative balance of power (Hermalin and Weisbach, 2003). As already noted, a primary board responsibility is choosing, monitoring, and possibly, replacing the CEO (Mace, 1986; Vancil, 1987), and directors with significant equity positions have strong incentives to actively monitor management (Daily and Dalton, 1997; Kosnik, 1990; Shleifer and Vishny, 1997). The CEO also plays an important role in selecting board members (Baker and Gompers, 2003; Hermalin and Weisbach, 1998; Lorsch and MacIver, 1989; Mace, 1986; Shivdasani and Yermack, 1999). Hermalin and Weisbach (1998) offer a model in which firm performance is the primary metric the board considers when deciding to retain or replace the CEO and relatively independent boards perform the process more effectively. According to Hermalin and Weisbach (2003), “the negative relationship between performance and CEO turnover is extremely robust across samples.” CEOs of well performing firms gain bargaining power and negotiate less independent boards with fewer outside directors (Hermalin and Weisbach, 1998). Furthermore, following good firm performance, CEOs are able to add more insiders to the board that owe their career success to the CEO (Hermalin and Weisbach, 1998). These additions may increase board size, which the CEO may prefer as smaller boards are viewed as more effective monitors (Jensen, 2012; Yermack, 1996). Empirically, while controlling for endogeneity, Wintoki, et al. (2012) find past performance has a negative impact on board independence and a positive effect on board size, but neither adjustment impacts subsequent performance. As CEO tenure is indicative of bargaining power (Baker and Gompers, 2003), we hypothesize:

Hypothesis 6. Poor past firm performance leads to shorter CEO tenure.

Hypothesis 7. Greater board equity leads to better monitoring and shorter CEO tenure.

Hypothesis 8. Smaller boards are better monitors leading to shorter CEO tenure.

Hypothesis 9. Board independence leads to better monitoring and shorter CEO tenure.

Hypothesis 10. Longer CEO tenure leads to less independent boards.

Hypothesis 11. Longer CEO tenure leads to larger boards.

Implications of Recent Work

Several of the empirical regularities identified by Hermalin and Weisbach (2003) do not appear to hold true, once endogeneity is properly accounted for. Generally, the significant effects of board size and independence and equity held by important decision makers do not persist, once the impacts of past performance on these variables is taken into account. Below, we provide brief summaries of studies addressing the endogeneity issue in the corporate governance literature.

Bhagat and Black (2002) address endogeneity of board independence, CEO ownership (i.e., equity), and financial performance of American firms using three stage least squares (3SLS). Their results suggest that firms suffering from low profitability respond by increasing board independence, but provide no evidence that independent boards achieve superior profitability. Their results are also consistent with CEOs receiving shares as a reward for past firm performance but not with the increased CEO equity leading to better subsequent performance. In fact, independence and board size have either insignificant or negative effects on subsequent performance, depending on performance measure employed.

Renders and Gaeremynck (2006) combine two stage least squares and Heckman (1976; Heckman, 1979) modeling procedures to respectively control for endogeneity of corporate governance and performance and for selection effects of analyzing only the 300 largest

capitalized European firms. Greater levels of closely held shares do not have a significant direct impact on performance in their analysis, but do significantly reduce corporate governance scores prepared by Deminor Ratings, which are positively related to various measures of financial performance.³

Pham, et al. (2011) and Wintoki, et al. (2012) utilize panel data and a generalized method of moments procedure to account for endogeneity of board independence, board size, and firms' financial performance. Upon accounting for endogeneity, neither study finds these board characteristics to impact financial performance, though Wintoki, et al. (2012) find past performance has a negative impact on board independence and a positive effect on board size.

Burress, et al. (2011) provide the only available insights regarding the extent to which findings of corporate governance research pertain to cooperatives. They find some evidence that smaller boards with outside directors granted voting rights perform better, but find no impact of the proportion of equity held collectively by the board. In light of the findings of recent corporate governance research, it is appropriate to revisit the issue of cooperative governance explored by Burress, et al. (2011), controlling for potential endogeneity that they did not address.

Measures and Methods

To investigate whether findings of corporate governance research are applicable to cooperatives, we test the above hypotheses using U.S. cooperative data from two sources: the U.S. Department of Agriculture (USDA) Cooperative Statistics database and a mail survey conducted in 2010. The sample frame consists of 2,252 U.S. farmer, rancher, and fishery cooperatives listed in the USDA Cooperative Statistics database, of which the top 1,000 constitute over 90% of U.S. agricultural cooperative business volume. Thus, we survey the top 1,000 cooperatives,

maintaining proportions by function similar to those of the population, as represented by the portion of 2009 revenue is attributed to marketing, supply, or service sales receipts. This delineation classifies 529 (53%) as marketing cooperatives, 412 (41%) as supply cooperatives, and 59 (6%) as service cooperatives.

Given limited resources, we survey board chairs. Board chairs are likely to have a longer tenure relative to other directors. In addition, chairs are often selected by their peers. Their leadership position and organizational memory provide a well-informed perspective. Of the 460 survey responses received, the majority are from marketing cooperatives (56%) followed by supply cooperatives (42%) and service cooperatives (2%). With available financial data and accounting for incomplete surveys, the sample available for analysis is 367 observations.

Performance Measures

We develop measures of financial performance from USDA Cooperative Statistics, including an extra-value index (*EVI*), return on assets (*ROA*), return on equity (*ROE*), and scale/factor measures of performance from survey responses (Chaddad, 2001; Liebrand, 2007; Ling and Liebrand, 1998). Specifically, financial performance is measured by annual *EVI*, *ROA*, and *ROE* statistics. *EVI* is useful for evaluating cooperative performance because it attempts to quantify opportunity costs of member equity capital and deduct this cost from the profitability ratio.⁴

Survey responses allow us to quantify non-financial measures important to cooperative health. Respondents evaluate performance by rating their cooperative's level of member satisfaction, competitive position in the industry, profitability, ability to achieve vision, and overall performance on a scale from one (equals "poor") to ten (equals "excellent") (Pearce and Zahra, 1991). Given high correlation among cooperative health performance measures (ranging

from 0.61 to 0.82), we calculate an overall *Cooperative Health* factor as the average of the five measures. Table 1 provides summary statistics for these performance variables along with measures of CEO and board characteristics and control variables discussed below. Financial performance varies considerably across firms, as indicated by maximum and minimum statistics and standard deviations, and in terms of mean values across years, and some financial measures (i.e., *ROE*) vary more than others.

Control Measures

To facilitate inference of the specific effects of CEO and board characteristics on cooperative performance, control variables are included in the regression analysis. The logarithm of the number of employees is included to control for cooperative size. Additionally, industry dummies developed from USDA Cooperative Statistics industry classifications control for industry effects.

Measures of Board and CEO Characteristics

Survey responses allow for measurement of constructs regarding board and CEO characteristics. Specifically, we consider *CEO Tenure* at the cooperative in that capacity, which averages 10.40 years in our sample (Table 1) compared to 15.50 years in corporations . Components of board structure considered here include board size, board independence, director tenure, director age, board ownership equity and diversity (i.e., gender). *Board Size* is the total number of board members, which averages nine for our sample (Table 1). *Independence* equals one if at least one independent, non-patron director serves on the board and is extended voting rights. Four percent of cooperatives in our survey have outside directors, and only half of those (two percent) extend voting rights to outside directors (Table 1). In comparison, corporate boards are larger with 11 members on average and have greater outsider presence with a 3:1 ratio of outsiders to insiders .

Equity is the proportion of cooperative equity held collectively by directors, which averages 11.25% for responding cooperatives (Table 1). *Female* equals the current number of female directors. About 12% of cooperatives in our sample report having at least one female director compared to about 90% of corporate boards .

Model

We address the possible endogeneity of board and CEO characteristics and firm performance using three stage least squares approach (3SLS), as described in Zellner and Theil (1962). This method combines the consistency of two stage least squares (2SLS) with the asymptotic efficiency of seemingly unrelated regression (SUR) by accounting for across equation correlation of errors. Each equation is estimated at once instead of separately as in 2SLS. 3SLS is a full information method, as it utilizes all the restrictions in the system when estimating structural parameters. 3SLS is consistent, and in general, asymptotically more efficient than 2SLS (Mikhail, 1975). In practice, when specifying estimation equations in 3SLS, one must heed the order condition for identification requiring the exclusion of at least as many exogenous variables as the number of endogenous variables included in a particular equation (Greene, 2008).

Results

Correlations

Notable correlation in performance exists across both measures and years (Table 2). Within a particular year, correlations across financial measures reach as high as 0.99 (e.g., ROE and ROA in 2005) but are somewhat more modest over time—usually a little less than 0.60. As an exception, correlation between ROE in 2008 and 2009 is 0.80. Smaller positive correlations exist

between *Cooperative Health* and financial performance measures, the highest of which is with *EVI* which takes into account the opportunity cost of equity for cooperative members.

Correlations between performance measures and all remaining variables are fairly small (Table 2), suggesting that much of the variation in performance is likely due to unaccounted for factors. *CEO Tenure* is positively correlated with most measures of current and past performance, as is *Independence*. Though still weak, the relation between *CEO Tenure* and *Cooperative Health* is stronger than with other performance measures. *Equity* held by the board is negatively related to current performance, except for *Cooperative Health*, and has relations of mixed sign with past levels of performance. The number of females serving on the board is negatively related to most measures of current and past performance. *Board Size* is negatively correlated with *ROA* and *EVI* but positively correlated with *ROE* and *Cooperative Health* in 2010, and negatively correlated with nearly every measure of past performance. The negative relationships with current values are consistent with the bulk of the corporate governance literature, while the positive relationships may be consistent with greater representation of cooperative members' interests. Correlations are also consistent with somewhat better performance by larger cooperatives, except when measured by *ROA*, which seems reasonable if cooperatives with more employees also have more assets.

Somewhat stronger correlations are apparent between firm and board characteristics (Table 2). These statistics indicate that larger cooperatives have larger boards with more outside and female directors. Correlations between *CEO Tenure*, cooperative size, and each board trait are small and negative. The negative correlation with *Independence*, in particular, is consistent with more powerful CEOs limiting the number of expert outside monitors on the board.

Regressions Results

Three stage least squares (3SLS) regressions are used to control for endogeneity, while investigating impacts of board structure on four measures of performance. Due to high correlation in annual performance, some corporate governance studies sample performance every 3 years to avoid multicollinearity (Boone, et al., 2007; Gompers, et al., 2003; Linck, et al., 2008). However, Wintoki, et al. (2012) find inferences regarding the relation between corporate governance and performance are insensitive to sampling every year or every three years. As correlations of performance measures over time in our data (Table 2) are usually less than common rules of thumb indicative of multicollinearity (e.g., greater than 0.70 or 0.80), we proceed by including each past value of a particular performance measure as explanatory variables in the *CEO tenure* equation. As an exception, the *Cooperative Health* model, for which lagged values aren't available, utilizes lagged values of *ROA*, which is the performance measure most closely related to *CEO Tenure*, as evidenced by statistics described below.

Indicators of model adequacy are presented in Table 3 and regression coefficients are presented in Table 4. In the interest of space, coefficients on industry dummy variables are not reported. As observed in Table 3, R^2 may be negative in 3SLS models, since errors are computed over a different set of regressors than that used to fit the model, and reporting the statistic is a matter of taste as it has no statistical meaning in this context (Sribney, et al., 1999). Wald tests reject the null hypothesis that predictor coefficients are not significantly different from zero at the 10% level or better for each equation in the *ROA* and *Cooperative Health* models, but cannot reject the null for *CEO Tenure* equations in *EVI* and *ROE* models (Table 3). These results reflect the difficulty in explaining *CEO Tenure*, which appears to be best explained by *ROA*. In light of these points, it is somewhat unsurprising that the *ROA* and *Cooperative Health* models indicate

more significant relationships between governance and performance than the other models in Table 4.

Regression coefficients in Table 4 offer some evidence of better performance by cooperatives with smaller boards (Hypothesis 2a) and outside voting directors (Hypothesis 1). For instance, decreasing board size by one director, on average, increases *ROA* about 21% and *Cooperative Health* by a little more than one unit on a scale from one (low) to ten (high). In contrast to Hypothesis 3, increasing board *Equity* share by one percent decreases *EVI* about 15% and *ROA* about 18%. In corporate governance research, decision makers with more equity at stake are generally believed to possess greater incentives to spur firm performance (Jensen and Meckling, 1976; Jensen and Warner, 1988; Morck, et al., 1988), but may engage in opportunistic self-dealing at intermediate levels of equity ownership (Morck, et al., 2005). Similarly, the negative impact of *CEO Tenure* on *ROA*, which is inconsistent with Hypothesis 5, may reflect opportunistic behavior by powerful CEOs or those near retirement. Such arguments may hold here as well, but another explanation is also possible if there are trade-offs between financial performance of the cooperative and the extent to which it serves the needs of its patron-members. That is, experienced CEOs and boards with more equity may sacrifice more in terms of *ROA*, for instance, to improve other aspects of cooperative performance. Here, *CEO Tenure* and *Equity* are positive, though statistically insignificant, in the *Cooperative Health* equation. Finally, in contrast to arguments that board diversity improve performance through insights into preferences of relevant consumer groups (Hypothesis 4a), *Female* has a significantly negative impact on *ROA* consistent with the alternative Hypothesis 4b. It may be that token female directors do not gain influence and diversity leads to clashes and delayed decision making, as predominately male patrons may prefer dealing with other males.

Regression coefficients for the *CEO Tenure* equation offer some evidence of greater CEO turnover (i.e., shorter tenures) due to poorer performance in 2006 and closer monitoring by boards with greater shares of equity, which corroborates Hypotheses 6 and 7, respectively (Table 4). However, signs of *Board Size* and *Independence* coefficients are inconsistent with the monitoring arguments underlying Hypotheses 8 and 9. Perhaps the results reflect impacts of better strategy formulation by smaller boards with outside voting directors that are not captured by lagged performance measures, particularly, if these effects materialize in better *Cooperative Health*, for which lagged values are not available. Interestingly, regression results are also inconsistent with Hypotheses 10 and 11, as greater *CEO Tenure* leads to greater incidence of boards with outside voting directors but does not impact board size. In the corporate governance literature, empowered CEOs negotiate less independent boards with fewer outside directors and more inside directors (i.e., management) that owe their career success to the CEO (Hermalin and Weisbach, 1998). In cooperatives, the board consists primarily of democratically elected patron members, and the CEO's ability to influence board composition is mostly limited to nominating industry experts to serve as outside directors. Wiser and more respected CEOs of greater tenure may be more successful in seating outsider industry experts on the board that can enhance cooperative performance. Finally, in relation to issues of endogeneity, larger cooperatives, as measured by *Log(Employees)*, have larger *Board Size* and greater *Independence*, with scale advantages in attaining *Cooperative Health* but lower *ROA*. If cooperatives with more employees also have more assets, it may not be unreasonable that they exhibit lower *ROA*.

Sensitivity Analysis

As sensitivity analysis, two 3SLS models are specified identical to that discussed above except that the *Equity* equation is dropped from the first model, and in addition to removal of this equation, *Size*, *Independence*, and *Equity* are dropped from the *CEO Tenure* equation in the second model. Regression coefficients for the performance equation from this last model are displayed in Table 5, as the results for other remaining variables in both specifications are mostly consistent with those discussed above.⁵ A noteworthy point for the model presented in Table 5 is that the χ^2 statistic for the Wald test rejects the null hypothesis that predictor coefficients are not significantly different from zero at the 10% level or better for each equation in the system. For the unreported model including *Size*, *Independence*, and *Equity* in the *CEO Tenure* equation, the statistic fails to reject the null hypothesis only for the *CEO Tenure* equation in the *Cooperative Health* model.

The results presented in Table 5 offer mixed evidence on Hypothesis 1, as *Independence* has significantly negative impacts on *EVI* and *ROE* and is only significantly positive in the *ROA* model. Greater support for Hypothesis 2a is obtained, as *Board Size* has a significantly negative impact on three of the four performance measures and has an insignificantly negative impact on *ROA*. The positive effect of *Log(Employees)* on performance exhibits a similar level of consistency across models. *Equity* no longer has the negative effect on financial performance observed in Table 4, and the previously insignificant positive impact on *Cooperative Health* is statistically significant in Table 5, consistent with Hypothesis 3. Together, these results seem consistent with the story of cooperative boards, comprised predominately of patron members with high levels of equity, sacrificing financial performance in order to better serve other needs of patron-members. Results for *CEO Tenure* may also be consistent with experienced CEOs

striving to better serve cooperative patron-members at the expense of *ROA*, while working to ensure satisfactory returns on member equity (i.e., *ROE*). Finally, the significance of the negative impact of *Female* on *ROA* observed in the initial specification (Table 4) recedes here, and the variable exerts a significantly positive impact on *ROE* (Table 5). This result is consistent with Hypothesis 4a and may reflect further insights into needs of relevant consumer groups offered by female directors, or perhaps, that females are more keenly attuned to equity as compared to boys with their toys (i.e., assets).

Conclusions

Empirical work in the field of corporate governance is extensive, but may not be uniformly applicable to cooperative businesses with patron-driven, multiple objective functions (Cook, 1995). Limited inquiry into the realm of cooperative governance suggests that best practices in corporate governance will not necessarily transfer into superior cooperative performance, but does not address the potential endogeneity of governance and performance (Burrell, et al., 2011). Recent work accounting for endogeneity in corporate governance literature effectively overturns several previously established empirical regularities (Hermalin and Weisbach, 2003), adding further uncertainty regarding likely impacts of governance choices for performance in corporations and cooperatives alike. Here, we attempt to account for some of the more widely recognized endogenous relationships in the corporate governance literature, as we investigate the impacts of governance decisions for the performance of cooperatives. Three stage least squares regressions and sensitivity analysis with respect to model specification, allow us to infer some consistent results. Namely, larger cooperatives with smaller boards tend to perform better—an empirical regularity for firms in the early corporate governance literature that is unsupported by

more recent work accounting for endogeneity. While an initial model specification indicates that seating outside directors with industry expertise on the board leads to better performance, this result is less consistent across performance measures in the sensitivity analysis. An important implication of our results, is that a trade-off appears to exist between financial performance and effectiveness in serving patron-members' needs, and consideration of measures of overall cooperative health, in addition to financial performance, is necessary to facilitate a comprehensive understanding of the implications of cooperative governance choices.

This study focuses on key aspects of governance emphasized in the corporate governance literature in order to facilitate comparison. Extensions of this analysis may add board processes identified by Burrell, et al. (2011) in addition to board composition. Conceptually, the anticipated causal relations and path-like effects of past performance influencing aspects of governance that subsequently influence performance suggest opportunities to address associated endogeneity issues using structural equation models (Pennings and Garcia, 2001) and directed acyclic graphs (Franken, et al., 2011; Franken, et al., 2012; Haigh and Bessler, 2004).

Funding and Support

This research received funding from USDA under Cooperative Research Agreement RBS-09-40.

We also acknowledge the detailed and enthusiastic responses of survey participants.

Endnotes

¹ The cooperative model also complicates the ownership rights definition, because residual claim and control rights are statutorily, and in practice, distinct from investor-owned firms.

² Larger boards also may possess greater diversity in expertise and are less apt to be commandeered by a powerful agent (Zahra and Pearce II, 1989). Further, larger boards may enhance organizational stability, as empirical evidence suggests that firms with larger boards exhibit lower variability in returns (Cheng, 2008) and are less likely to enter bankruptcy (Chaganti, et al., 1985; Finkle, 1998).

³ In this study, closely held shares include those held by officers, directors and their immediate family, and shares held by another corporation, by pension or benefit plans, and by individuals holding 5% or more of the outstanding shares.

⁴ We utilize the same method as Liebrand (2007) to calculate *EVI*: $EVI = (\text{Net Income after Taxes} - [(\text{Total Equity}) * (\text{LIBOR 12 month maturity December average} + 2\%)]) / (\text{Total Assets} - \text{Current Liabilities})$. To estimate an interest surcharge, we add two per cent to the 12-month maturity December average of the London Interbank Offered Rate (LIBOR). We multiply this surcharge by total equity to calculate the opportunity cost of capital for members. This opportunity cost of capital is subtracted from net income after taxes; we then divide by total assets less current liabilities.

⁵ As an exception, *CEO Tenure* is no longer significantly positive in the *Independence* equation for any of the models.

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Table 1. Summary Statistics.

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
<u>Performance Measures:</u>					
EVI_2005	454	7.89%	108.69%	-343.00%	2282.00%
EVI_2006	454	3.71%	12.86%	-45.00%	174.00%
EVI_2007	458	7.22%	10.92%	-19.00%	94.00%
EVI_2008	460	11.85%	13.03%	-26.00%	97.00%
EVI_2009	460	11.30%	27.57%	-56.00%	519.00%
EVI_2010	453	32.84%	533.50%	-256.20%	11353.86%
ROA_2005	454	7.09%	28.75%	-19.00%	605.00%
ROA_2006	454	5.92%	5.96%	-19.00%	39.00%
ROA_2007	458	7.43%	6.81%	-11.00%	45.00%
ROA_2008	460	8.26%	7.15%	-18.00%	62.00%
ROA_2009	460	8.10%	9.35%	-52.00%	104.00%
ROA_2010	453	6.66%	8.86%	-52.33%	139.19%
ROE_2005	454	48.58%	793.43%	-630.00%	16902.00%
ROE_2006	454	12.65%	17.54%	-159.00%	181.00%
ROE_2007	458	17.54%	15.53%	-17.00%	121.00%
ROE_2008	460	20.70%	30.18%	-503.00%	128.00%
ROE_2009	460	18.00%	42.28%	-503.00%	522.00%
ROE_2010	453	15.61%	19.92%	-88.80%	169.19%
Coop Health ^a	453	8.01	1.34	2.00	10.00
<u>Cooperative Characteristics:</u>					
Employees	460	195.08	641.33	0	9738.50
CEO Tenure	451	10.40	8.66	0.50	50.00
Board Size	456	9.07	4.23	5.00	51.00
Independence (=1 if outside voter)	459	0.02	0.15	0.00	1.00
Board Equity (% held in total)	398	11.27%	16.70%	0.00%	100.00%
Female (No. of Female Directors)	437	0.13	0.37	0.00	3.00

^a Respondents rated their cooperatives for items in Table 1 on a scale from 1= poor to 10 = excellent.

Table 2. Correlation Matrix.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1 CEO Tenure	1.00																								
2 Log(Employees)	-0.01	1.00																							
3 Board Size	-0.07	0.55	1.00																						
4 Independence	-0.08	0.17	0.22	1.00																					
5 Equity	-0.01	-0.07	0.04	0.09	1.00																				
6 Female	-0.03	0.14	0.19	0.07	0.00	1.00																			
7 Coop Health	0.25	0.05	0.02	0.06	0.08	-0.05	1.00																		
8 ROA_2010	0.08	-0.11	-0.03	-0.01	-0.09	-0.05	0.07	1.00																	
9 ROA_2009	0.07	-0.08	-0.05	0.02	-0.04	-0.03	0.16	0.75	1.00																
10 ROA_2008	0.09	-0.03	-0.13	0.08	0.07	-0.07	0.23	0.19	0.34	1.00															
11 ROA_2007	0.02	-0.05	-0.07	0.07	0.09	-0.04	0.16	0.20	0.26	0.54	1.00														
12 ROA_2006	0.11	0.03	-0.03	-0.02	-0.04	0.02	0.21	-0.04	0.10	0.32	0.58	1.00													
13 ROA_2005	-0.05	-0.07	-0.06	-0.02	0.03	-0.02	0.06	-0.03	-0.04	-0.02	0.02	0.04	1.00												
14 ROE_2010	0.05	0.03	1×10 ⁻³	0.05	-0.08	-0.05	0.07	0.73	0.57	0.15	0.11	-0.01	0.06	1.00											
15 ROE_2009	0.07	0.03	0.01	0.05	0.01	-0.01	0.16	0.27	0.50	0.22	0.14	0.11	0.04	0.43	1.00										
16 ROE_2008	0.08	-0.01	-0.03	0.05	0.03	-0.04	0.19	0.07	0.20	0.44	0.20	0.16	0.05	0.14	0.80	1.00									
17 ROE_2007	0.04	-0.01	-0.05	0.06	0.04	-0.08	0.14	0.13	0.23	0.43	0.73	0.41	-0.01	0.28	0.30	0.39	1.00								
18 ROE_2006	0.05	-0.07	-0.07	0.01	-0.02	-0.05	0.14	-0.03	0.09	0.15	0.25	0.57	0.00	0.12	0.16	0.23	0.47	1.00							
19 ROE_2005	-0.06	-0.07	-0.05	-0.01	0.03	-0.02	0.03	-0.03	-0.04	-0.06	-0.06	-0.06	0.99	0.06	0.03	0.03	-0.06	-0.05	1.00						
20 EVI_2010	0.10	0.16	-0.03	0.01	-0.01	0.01	0.28	-0.22	-0.13	0.03	-0.11	0.16	-0.02	0.18	0.08	0.05	0.03	0.23	-0.03	1.00					
21 EVI_2009	0.07	-0.10	-0.06	0.02	-0.03	-0.01	0.20	0.63	0.88	0.28	0.16	0.11	-0.04	0.61	0.59	0.28	0.25	0.19	-0.04	0.10	1.00				
22 EVI_2008	0.04	-0.11	-0.12	0.07	0.00	-0.12	0.23	0.13	0.27	0.73	0.30	0.22	-0.02	0.20	0.31	0.59	0.57	0.44	-0.03	0.15	0.37	1.00			
23 EVI_2007	0.01	-0.11	-0.08	0.05	0.06	-0.05	0.16	0.17	0.22	0.41	0.75	0.42	-0.03	0.19	0.20	0.32	0.92	0.54	-0.08	0.00	0.27	0.60	1.00		
24 EVI_2006	0.05	-0.08	-0.06	0.00	-0.04	0.03	0.14	-0.06	0.02	0.11	0.22	0.55	-0.02	0.09	0.11	0.23	0.52	0.84	-0.06	0.27	0.17	0.51	0.64	1.00	
25 EVI_2005	-0.06	-0.08	-0.05	-0.01	0.03	-0.04	0.03	-0.04	-0.05	-0.04	-0.04	-0.05	0.99	0.04	0.02	0.05	-0.04	-0.04	0.99	-0.06	-0.07	-0.01	-0.05	-0.06	1.00

Note: N = 367.

Table 3. R-Square Statistics of Three Stage Least Squares Regressions of Performance on Governance.

	EVI Model			ROE Model			ROA Model			Cooperative Health Model		
	Wald Test			Wald Test			Wald Test			Wald Test		
	R^2	χ^2 Statistic	p -value	R^2	χ^2 Statistic	p -value	R^2	χ^2 Statistic	p -value	R^2	χ^2 Statistic	p -value
<i>Performance</i>	-130.46	67.93	0.00	-41030.00	208.56	0.00	-1993.50	181.18	0.00	-34.63	86.14	0.00
<i>CEO Tenure</i>	-0.04	7.81	0.45	-0.05	6.81	0.56	-0.30	52.55	0.00	-0.24	13.42	0.10
<i>Independence</i>	-4.05	32.68	0.02	-0.36	48.81	0.00	-1.91	54.12	0.00	-1.83	42.29	0.00
<i>Board Size</i>	0.35	197.21	0.00	0.35	201.06	0.00	0.34	201.54	0.00	0.36	216.59	0.00
<i>Equity</i>	0.28	141.52	0.00	0.27	141.26	0.00	0.00	124.38	0.00	0.04	118.72	0.00

Table 4. Results of Three Stage Least Squares Regressions of Performance on Governance.

<i>Performance</i>	EVI Model	ROE Model	ROA Model	Health Model
CEO Tenure	-0.085 (0.064)	2.249 (2.856)	-0.217*** (0.063)	0.489 (0.318)
Log(Employees)	-0.317 (0.318)	16.561 (19.277)	-0.551** (0.242)	6.719*** (1.810)
Board Size	-0.087 (0.056)	-1.637 (1.703)	-0.208*** (0.032)	-1.196*** (0.378)
Independence	6.525*** (1.717)	-251.040 (293.611)	20.577*** (1.688)	-29.412 (22.833)
Equity	-14.495*** (2.735)	55.764 (86.262)	-18.239*** (3.776)	27.422 (18.862)
Female	-0.021 (0.089)	3.124 (7.116)	-0.109** (0.043)	1.162 (0.995)
Constant	3.637*** (1.078)	-41.257 (52.913)	6.650*** (1.181)	-0.216 (7.825)
<i>CEO Tenure</i>				
Performance05	-0.304 (0.327)	-0.044 (0.044)	-0.907 (1.089)	-1.505 (1.042)
Performance06	4.333 (4.376)	0.017 (2.544)	22.698** (10.171)	19.109* (10.082)
Performance07	-5.189 (4.105)	1.440 (2.742)	4.835 (7.247)	-9.310 (7.022)
Performance08	4.028 (4.886)	1.906 (2.239)	2.114 (9.232)	7.040 (9.510)
Performance09	1.458 (2.097)	0.183 (1.596)	-16.920*** (3.426)	2.728 (3.643)
Independence	9.434 (17.138)	11.651 (16.980)	28.280* (17.214)	27.363* (15.314)
Board Size	-0.248 (0.281)	-0.283 (0.270)	-0.472* (0.282)	-0.449 (0.281)
Equity	-5.571 (7.509)	-7.491 (7.261)	-14.009* (7.404)	-11.118 (6.930)
Constant	12.454*** (3.202)	12.694*** (2.988)	15.051*** (3.197)	13.822*** (3.112)

Table 4 Continued ...

	EVI Model	ROE Model	ROA Model	Health Model
<i>Independence</i>				
Equity	1.576** (0.664)	0.182 (0.477)	1.026*** (0.337)	1.109*** (0.377)
Log(Employees)	0.083** (0.034)	0.040** (0.020)	0.063*** (0.019)	0.073*** (0.021)
CEO Tenure	0.014 (0.016)	0.009 (0.008)	0.011** (0.006)	0.011* (0.006)
Constant	-0.431* (0.259)	-0.173 (0.122)	-0.309*** (0.101)	-0.331*** (0.114)
<i>Board Size</i>				
Log(Employees)	3.539*** (0.369)	3.553*** (0.346)	3.608*** (0.329)	3.749*** (0.324)
CEO Tenure	-0.065 (0.261)	-0.028 (0.191)	0.030 (0.119)	0.025 (0.115)
Constant	3.522 (3.095)	3.128 (2.295)	2.393 (1.502)	2.172 (1.464)
<i>Equity</i>				
Board Size	0.003 (0.010)	-0.002 (0.013)	-0.023* (0.012)	-0.021* (0.013)
Log(Employees)	-0.039 (0.039)	-0.022 (0.049)	0.055 (0.046)	0.050 (0.049)
Constant	0.135*** (0.037)	0.148*** (0.045)	0.206*** (0.043)	0.199*** (0.041)

Note: *, **, *** denote statistical significance at 10%, 5%, 1%. Standard errors in parentheses.

Table 5. Sensitivity Analysis for Regressions of Performance on Governance.

	EVI Model	ROE Model	ROA Model	Health Model
<i>Performance</i>				
CEO Tenure	0.081 (0.061)	0.227** (0.115)	-0.012** (0.005)	0.212* (0.113)
Log(Employees)	0.925*** (0.333)	2.271*** (0.303)	-0.003 (0.076)	5.483*** (1.443)
Board Size	-0.205** (0.090)	-0.402*** (0.044)	-0.019 (0.019)	-1.328*** (0.339)
Independence	-4.358** (2.043)	-25.693*** (4.001)	1.518*** (0.395)	-9.094 (6.227)
Equity	0.042 (0.150)	-0.686 (0.568)	0.055 (0.049)	1.309** (0.632)
Female	0.174 (0.121)	0.400*** (0.101)	-0.020 (0.030)	0.908 (0.599)
Constant	-0.454 (0.775)	-2.355* (1.429)	0.351*** (0.080)	8.219*** (1.549)

Note: *, **, *** denote statistical significance at 10%, 5%, 1%. Standard errors in parentheses.