Impact of Perceptions and Practices on the Financial Performance of Texas Cooperatives

Amy Hagerman, David Leatham, and John Park

Agricultural and Rural Finance
Markets in Transition
Proceedings of Regional Research Committee NC-1014
Minneapolis, Minnesota
October 3-4, 2005

Impact of Perceptions and Practices on the Financial Performance of Texas Cooperatives

by
Amy Hagerman, Texas A&M University
David Leatham , Texas A&M University
John Park, Texas A&M University

Abstract

The changing business environment and evolving culture of cooperatives create a need to re-evaluate the drivers of cooperative performance. Literature suggests that these drivers could be operational, practices or perceptions. Our model of cooperative performance integrates these variables to determine if they have a causal influence on performance. The model is built from a survey of managers in Texas. The results indicate that company size and structure, perceptions of external environment, and best practices could potentially be driving performance as measured by return on equity; however, the sample size is too small to make any certain conclusions.

Keywords: Financial Performance, Agribusiness Cooperatives, Causality

Impact of Perceptions and Practices on the Financial Performance of Texas Cooperatives

by
Amy Hagerman, Texas A&M University
David Leatham , Texas A&M University
John Park, Texas A&M University

Introduction

Change is a natural part of life and for the food and fiber system change is both exciting and frightening. The agricultural cooperative industry is no exception. Like other types of agribusinesses, cooperatives have dealt with narrowing margins and rising input costs by taking advantage of opportunities to increase efficiency. This includes economies of size and scope. A trend of consolidation has been occurring since the mid-1980s (Zuelli 2003). Although the number of cooperatives has declined dramatically, the cooperative business volume has increased. Texas has followed this trend as shown by the decline from 511 cooperatives in 1965 to only 228 in 2001, a 45% decline. By comparison, if the gross sales cooperatives in Texas did were changed to real gross sales with a 1965 base, then in 1965 cooperatives did $1,128 million in real gross sales compared to $6,337 million in real gross sales in 2002 (USDA RBS 2003).

Cooperative agribusinesses have gained efficiency by better customizing their business to the market. This may include practices such as differential pricing, providing specialized services, and expanding product offerings. This type of diversification occurs in markets where most customers make small purchases, examples include: small acreage fertilizer spreading, pet grooming and supplies, flower and garden stores, and custom feed orders in small quantities. These types of services are most often seen in areas encroached upon by urban sprawl. The other end of the spectrum, whose customers are very large producers, also provides an opportunity to serve a specialized need. This may include fuel delivery, bulk discounts, or the services of trained in house agronomists and nutritionists. For some cooperatives, efficiency is gained by no expansion whatsoever; instead, it is gained through careful management of current divisions. There are many successful cooperatives, each with a unique recipe for success. What they share is a drive to excel as a business and assure their members will own a successful enterprise lasting well into the future.

As cooperatives have changed to become more efficient it has caused an "evolution" of the cooperative model. This evolution has caused a shift in more than just margins and efficiency. A recognizable shift in cooperative culture is becoming apparent as well. Cooperatives historically had a clan culture characterized by loyalty and a family like atmosphere. Today, cooperatives appear to be moving to a market culture characterized by efficiency and profit maximizing behavior (Hind 1987, Hogeland 2004). When the changes in business operation and culture are taken together, the resulting cooperative is more reflective of their non-cooperative counterparts than their service oriented ancestors.

Evolution of the cooperative model will cause changes in cooperative performance. Theoretically, as cooperatives expand and become more efficient they will experience increased performance. As they move toward a market culture, the forces of change could change as well. There is little cooperative literature on factors affecting cooperative performance, but the evolution of the cooperative model could make the non-cooperative models more relevant than ever before.

White and Hamermesh propose an integrative model of performance that is reflective of the integration of financial and non-financial factors that we wish to show in this study. This framework is shown in Figure 1. In this study the author posits that characteristics unique to an industry can have a direct impact on performance. Furthermore, the manager's perception of the business environment plays into the development of the company's strategy. Strategy in turn guides the choices made in developing company structure. This study does not apply any empirical work to test this proposed model, instead it suggests that it be empirically tested in the future. What this model provides is a structure on which to hypothesize the variables that will impact cooperative performance.

Figure 1: White and Hamermesh's Integrative Model of Performance (1981)
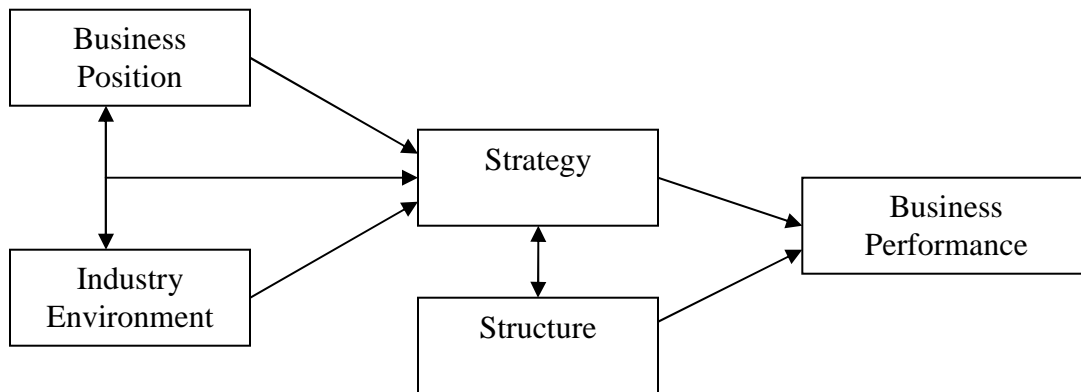
The objective of this study is to identify those perceptions and practices which directly affect Texas cooperatives' financial performance. Understanding the forces driving the current financial performance of cooperatives could explain why, for some, the changes in the current business environment has led to expansion, growth and well deserved financial success. Meanwhile, others struggle to adjust in this changing business environment and eventually sink into a state of financial stagnation, just trying to make it through one more year. The remainder of this paper is broken into four sections. First, the dataset is discussed. Second, the variables used in this analysis are presented. These variables include those used to measure performance, historical drivers of performance, and potential drivers of performance. Third, methodology will be presented, followed by the results of the analysis in the fourth section.

The Data Set
The data set for this study is developed from a survey of cooperative managers in the 2003-2004 fiscal year. Respondents are managers of agribusiness cooperatives providing

services and supplies. Electrical, telephone, and financial cooperatives are significantly different than agricultural cooperatives, and warrant a separate study. A pre-test was performed on a small group of managers and cooperative industry professionals. It was then revised and mailed to 230 agribusiness cooperatives in Texas. The survey had a 20% response rate, corresponding to a sample of 47 cooperatives out of the population. The content included a short financial section, operational information, and a list of questions on manager perceptions and practices. Variable selection was based on previous studies and the feedback from the pre test group. Not all of the variables collected are used here.

Variables

The first step in determining a factor's influence on performance is to determine how to define influence. Two financial measures are used here, a return on equity (ROE) and debt to equity (D/E). Once these ratios have been established a range of variables that could potentially drive them are proposed. These causal variables are split into three categories. The first is the operational characteristics of the company. These are included to account of the causal effect of the size and structure of the company, as reflected in Figure 1. The second is the best management practices of company leadership. Training programs for management and directors are largely based on the teaching of best practices. For many companies best practices have improved their efficiency and bottom line, however, they tend to be one size fits all. Finally, the perceptions of management are considered as possible causes. There have been only a few studies that attempt to relate manager perceptions to performance, and few of them look at the combined effect of perceptions and practices. Each of these categories is considered in more detail below.

Performance Variable: ROE

There are many variables that could have been chosen to capture the performance of the firm. Other authors have used return on assets, return on equity, market share, profit margin, growth relative to competition, customer orientation, liquidity, leverage and asset turnover (Harling and Funk 1987, Nerver and Slater 1990, Kyriakopoulos, Meulenberg and Nilsson 2004, Rotan 2004). For the purposes of this study Return on Equity (ROE) was chosen because it is a measure of member returns that is not biased by depreciation, as Return on Assets is, and does not vary as much as Return on Sales. This measure is particularly useful in agribusiness cooperatives as most of their assets are old and have been fully depreciated.

Leverage Variable: Debt to Equity

Debt to equity is the measure of leverage chosen for this study. A valid question is: why include leverage variables at all when it is the performance of the cooperative that we are most interested in? The answer lies in the purpose of the cooperative, which is to serve the needs of a specific member group. The amount of membership ownership becomes an important variable in whether or not the cooperative is performing well as a steward of the members' investment. The cooperative membership provides not only the customer base of the company but also provides the capital for the company. An important issue in running a cooperative business is assuring the members own a sufficient portion of the company, and that it is unlikely to be seized by non-membership control. Debt to equity

is particularly important in cooperatives because it measures how much external debt the cooperative is using as a percentage of the members' ownership in the firm.

Operational Variables

The operational variables of the firm have been proven to influence financial performance. It is well documented that companies, cooperative or non-cooperatives, gain from expanded size and scope. Also, larger memberships mean less pressure is placed on the cooperative in the event of a single member leaving the company. Other operational variables include the number of business departments or services the company has to offer. The capital expenditures of the company are an operational variable rather than a best practices variable from the standpoint that there is no set amount that should be spent on the company in any given year. A successful cooperative may not have a need to spend a great deal on capital improvements or expansions in any given year. However, it is possible that this variable could be causal to financial performance and therefore cannot be ignored. A summary of the operational variables considered in the model are as follows:

- Regional (re)
- Active Membership (am)
- Board Size (bs)
- Number of Branches (bc)
- Number of Business Activities (ba)
- Number of Business Rivals (br)
- Average Annual Capital Expenditures (aace)

Best Management Practices

Best management practices are touted by cooperative educational materials as one of the best ways to increase the efficiency and performance of the cooperative. The diversity in size and function of the sample creates a challenge in selecting best practices variables. There is some disagreement regarding whether or not there is one set of best management practices that are universal to companies of all sizes. Some sources claim that best practices are universal to small and large companies alike, while others argue that small firms should not necessarily participate in the same best practices as large firms. There is no way of knowing for sure which is correct, so for now we have chosen some of the basic practices that are recommended in most management literature. The practices that will be included in this study are as follows:

- Strategic Planning (sp)
- Equity Redemption (er)
- Top Customer Identification (tc)
- Time Management (tm)
- Boardroom Order (pp)

Perceptions Variables

The idea that the perceptions of management influence the business is not new to strategic management literature. White and Hamermesh propose that perceptions help form the strategy of the business, which directly impacts performance (1981). More

recently, Stimpert and Duhaime propose that a manager's view of the industry he/she competes in will determine the strategy of the company. They further note that streams of every day decisions about the industry, diversification, and business strategy influence performance (1997). The perceptions variables in this study cover the areas of globalization, government policies, member loyalty and education, and the manager's view of his competitive position. Specifically they are:

- Global Awareness: How critical managers rate the globalization of national and world economies to the business (gn)
- Environmental Perception: How critical expanding environmental regulations and legal liabilities are to the operation of their business (gl)
- Farm Program Perception: How critical the farm programs are to their membership and operation (fp)
- Labor Perception: How critical labor regulations are to the operation of their business (lr)
- Perception of Employees: The impact of employee expertise on member loyalty (pe)
- Perception of General Manager: How confidence in the general manager impacts member loyalty (gm)
- Perception of Board: How confidence in the board impacts member loyalty (bd)
- Education Perception: The importance of educating members of the operational decisions of the company and the logic behind them (ed)
- Membership Perception: The manager's perception on how well the membership understand how the company's equity redemption plan works (ec)
- Competition Perception: The manager's perception of the company's position as a competitor with peers (lc)

Methods

In order to achieve our objective we must do three things. 1) Identify variables that have a causal impact on performance. 2) Determine if they have a significant impact on performance. 3) Draw conclusions regarding whether perceptions and practices are among those variables that directly impact performance. Our procedure for these three steps is to first use causal diagrams, specifically directed acyclic graphs, to identify which of the operational, perception, and practice variables have a causal impact on performance. Then use the paths specified in the graph to perform ordinary least squares regressions to determine which of the variables has a significant impact. These results can then be used to draw conclusions as to which perception and practice variables impact performance, if any.

We use directed graph methodology in combination with regression analysis instead of factor analysis or regression analysis alone for several reasons. The decision to use causal diagrams as opposed to factor analysis is primarily a matter of preference, as they should yield a similar resulting model (Glymour et al. 1987). Furthermore, it is possible that many different models can describe some sort of causal relationship among the variables described here. The Greedy Extraction Search (GES) Algorithm we use repeatedly tests correlations between variables until the best model is reached, increasing the likelihood of finding a model that fits the data well. The causal model does not provide a direction

of causation or a magnitude of effect, which is why it is used in combination with regression models. Regressions alone would be difficult for this study because there is little cooperative literature on which to develop the models. The causal graph provides a way to identify regression components.

Specifically this study seeks to identify directed acyclic graphs. The word "directed" implies a unidirectional movement and "acyclic" implies that no causal path leads away from a variable only to return to that same variable (Pearl 2000). Kyriakopoulos, Muelenberg and Nilsson argue that a unidirectional movement will occur between cooperative variables and market variables. This is based on work showing how cooperatives change gradually over time in response to a dynamic market (2004). The program TETRAD IV was used to develop the causal graphs and Simetar was the statistical software used in developing the regressions. Glymour, Scheines, Spirtes and Kelly provide the procedure for transforming directed graph paths into regression models (Glymour et al, 1987).
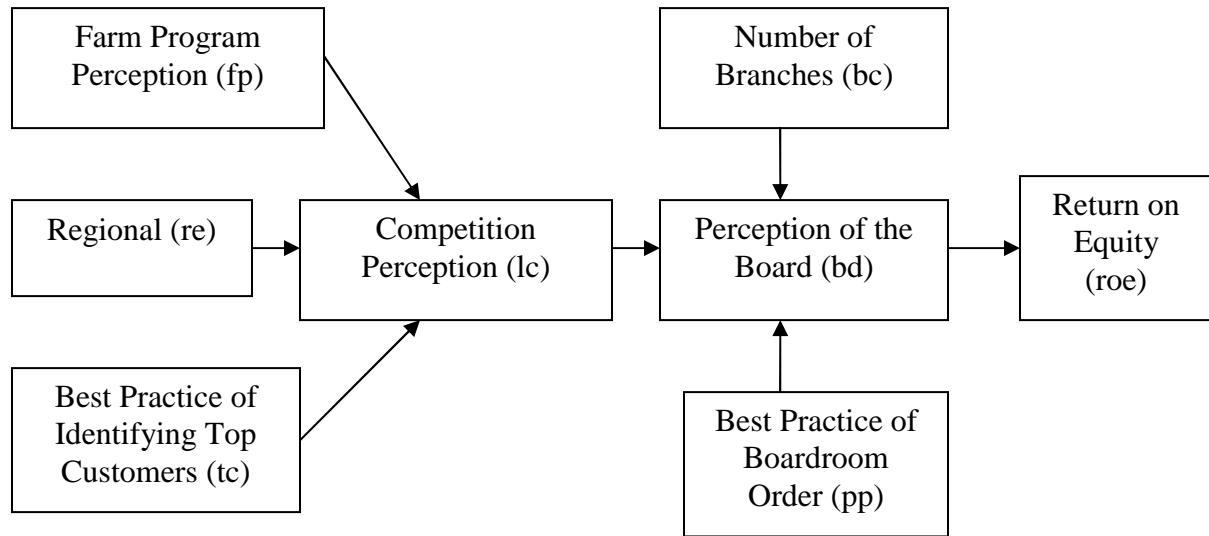
Each acyclic path has a beginning (root), and an end (sink). For the regression models the sink serves as the dependent variable and the root serves as an independent variable. Each path has only one sink, but it can have multiple roots. Other independent variables may be added as appropriate based on whether they would be needed to block backdoor paths to the sink variable. If these backdoor paths are not blocked, they could provide excessive noise in the error term. The following model contains the performance, leverage, operational, best practices, and perceptions variables. Only the paths containing the performance and leverage variables are reported.

Results

The first step in this analysis is to obtain a correlation table of the variables of interest. This is the input requirement for the GES Algorithm, but it is also important that the correlations between the variables be significant enough to provide a meaningful causal relationship. As a general rule of thumb, correlations of .3 or below and samples of less than 300 should be considered with care. This is because the algorithm is too generous in accepting tetrad equations when the correlations are less than .3. However, the authors of TETRAD also note that for small samples a higher significance level should be used to help offset this limitation. In our case, with a sample of less than 100 observations, they recommend a significance level of 20% (Glymour et al. 1987). The directed acyclic graph resulting from the full correlation table has many roots and sinks; however, the two paths of interest to this study are the paths involving return on equity and debt to equity. Debt to equity is the root on a two variable path. It sinks into Membership Perception. This path provides little useful information for the purposes of this study.

The return on equity graph contains more interesting information. The directed acyclic graph presented in Figure 2 is only one path on a much more complex graph that contains many roots and sinks. However, only the ROE path is of any interest for analyzing our objective. Return on equity is indeed a sink, as we would expect. There are five root variables leading into it that represent all three of the variable categories. A more in depth discussion for each of these follows.

Figure 2: Impact of Operational, Practices and Perceptions Variables on Performance

```
┌─────────────────┐                           ┌─────────────────┐
│  Farm Program   │                           │   Number of     │
│ Perception (fp) │                           │  Branches (bc)  │
└─────────────────┘ ╲                         └─────────────────┘
                     ╲                                 │
┌─────────────────┐   ╲  ┌─────────────────┐   ┌──────▼──────────┐   ┌─────────────┐
│  Regional (re)  │ ───► │  Competition    │──►│ Perception of   │──►│  Return on  │
└─────────────────┘      │ Perception (lc) │   │  the Board (bd) │   │   Equity    │
                     ╱   └─────────────────┘   └─────────────────┘   │    (roe)    │
┌─────────────────┐ ╱                                 ▲              └─────────────┘
│ Best Practice of│╱                          ┌───────┴─────────┐
│ Identifying Top │                           │ Best Practice of│
│ Customers (tc)  │                           │   Boardroom     │
└─────────────────┘                           │   Order (pp)    │
                                              └─────────────────┘
```

First the operational variables that have a direct causal influence on ROE are the number of branches the cooperative operates (bc) and whether or not the cooperative is regional (re). The number of branches includes the main location of the cooperative and any satellite locations the company may operate. This variable is negatively correlated to the performance of the cooperative. This is plausible in that more branches do not necessarily correspond to economies of size, rather the company can be less efficient when it is more spread out geographically.

The second operational root, regional, also relates to the efficiency and size of the companies in the study. This dummy variable measured whether or not the cooperative is a regional federated structure. Loosely defined, a federated regional is a cooperative owned by other cooperatives rather than by investors at the base level (Dunn et al 2003). The high profile business failures of Farmland and Agway have brought this model under fire at the national level. The argument is that this regional model takes the control too far out of the hands of farmer investors. However, smaller regional cooperatives that are based out of only one or two states do not appear to be having the same difficulties. These companies are thriving all across the Midwest and South. This is supported by a positive correlation between whether or not a cooperative is regional and ROE.

Two best management practices are root variables in the model, boardroom order and identification of top customers. The question used to measure boardroom order is whether or not the cooperative follows parliamentary procedure in their board of director meetings. This practice is encouraged to allow directors equal opportunities to voice their opinions and to keep the meeting on track. This variable may in fact be capturing an effect of having an efficient, knowledgeable board of directors. However, the true impact is impossible to know without further study. The second variable is the practice of

identifying top customers. Specifically, the question asks whether the cooperative knows of and is taking steps to retain their top 25 customers. Industry professionals consider this to be a practice that will become more necessary further into the future. In general, cooperative membership was once homogenous made up primarily of medium sized farmers (Hogeland 2004). However, modern trends have led to a bipolarization of cooperative membership where a small minority of large farmers provides the majority of sales volume. In 2002, 8% of farms generated 68% of all farm production (Dunn et al. 2003). Cooperatives are finding it necessary to identify the large producers in their area to assure that the company is servicing those members' needs.

The final root variable in this model is related to the manager's perceptions of how critical farm programs are to the successful operation of the business (Farm Program Perception). This question was asked on a likert scale with one being not critical and five being very critical. The positive relation to ROE could be reflective of the manager's awareness of the situation the farmer members of that cooperative are in. Although the other two perceptions variables that show up in this graph are not roots, it is worth noting that White and Hamermesh propose that perceptions form cooperative strategy. If that is so, the two non-root perception variables are in the same position in the graph as strategy is in White and Hammermesh's integrated model. Generally, the model presented here is very similar in form and flow to the model that they present.

A closer look at the correlations and statistics going into the graph reveal a potential contradiction. Table 1 shows the summary statistics and correlation significance among the variables that are along the ROE path. The means and standard deviations marked N/A are dummy variables, which are used in the case of best practices that the cooperative either does or does not do. As the correlation significance in this table is compared to the directed acyclic graph, we can see that all of the direct causal relationships are correlated above the .3 mark. This means that the model is more likely to fit the data well. However, the small sample size could potentially compromise the goodness of fit.

Table 1: Means, Standard Deviations and Correlations

Variables	Mean	Std Dev	Correlation Significance							
			roe	Re	bc	tc	pp	fp	bd	lc
1. Return on Equity (roe)	23%	.378	1							
2. Regional (re)	N/A	N/A	*	1						
3. Number of Branches (bc)	2	1.81	*	-	1					
4. Identifying Top Performers (tc)	N/A	N/A	-	-	-	1				
5. Boardroom Order (pp)	N/A	N/A	-	-	-	-	1			
6. Farm Program Perception (fp)	4.05	1.24	*	-	-	-	-	1		
7. Perception of Board (bd)	4.11	.667	***	-	***	-	***	***	1	
8. Competition Perception (lc)	4.27	0.81	-	***	-	***	-	***	***	1
t values: *** .05 significance, **.10 significance, * .20 significance										

This contradiction means that the analysis be taken one step further by running an ordinary least squares regression on the ROE path. This analysis provides us with information on whether or not the model fits the data well. According to the procedure presented by Glymour et al. for transforming a directed acyclic path into a regression, we must first allow an error term to be attached to the sink ROE. This sink serves as the dependent variable. Then the five roots of the path become the independent variables. In the case of this path the regression will be:

$$ROE = \beta1 + \beta2(re) + \beta3(bc) + \beta4(tc) + \beta5(pp) + \beta6(fp) + \varepsilon$$

The output of the regression is provided in Table 2. The t-statistics of each beta are not significantly different from zero at the 5% or 10% level and the R^2 statistic is low (.255). We can conclude that the model does not significantly fit the data. However, this does not mean that there is not some potential validity in the results. The poor fit could be due to the small sample size or the presence of a latent variable.

Table 2: Regression Output for Dependent Variable ROE

Variables	Beta	t-stat
1. Intercept	-0.599	-1.109
2. Regional (re)	0.185	1.207
3. Number of Branches (bc)	-0.400	-1.025
4. Identifying Top Performers (tc)	-0.108	-0.765
5. Boardroom Order (pp)	0.132	0.487
6. Criticalness of Farm Programs to the Cooperative (fp)	0.042	0.465

Conclusions

In this article we have attempted to identify the causal influences of best practices and manager perceptions on the financial performance of cooperatives in Texas. Our research focuses on cooperatives because their evolving culture and changing environment need review to discover what drives performance in this unique industry. Texas particularly has a highly diverse cooperative industry, which makes it an excellent setting to study the influence of non-financial factors on performance.

Although we considered it possible that, due to the nature of cooperative businesses, debt to equity could be a measure of the cooperative's stewardship of member resources, this does not appear to be so. The path corresponding to return on equity, however, does provide us with evidence that perceptions and practices could potentially influence performance, as earlier suggested by White and Hamermesh. Given this may be true; managers and boards of directors should seek out resources to learn more about implementation of best practices (i.e. parliamentary procedure, strategic planning, and customer segmentation), increasing efficiency, and communication with membership. Their local cooperative extension service or state cooperative council can provide additional materials and counseling.

While best practices may be taught through educational programs, perceptions are individual to the manager. Managers of successful cooperatives appear to be confident

competitors, excellent at managing human resources and time, and visionary leaders of the membership. Furthermore, they must be aware of the impact government policies and expanding world markets have on their business. It is the duty of the board of directors to seek out such leaders and allow them enough freedom to do their job well, while still keeping the interests of members first.

References

1. Dunn, J., A. Crooks, D. Frederick, T. Kennedy, J. Wadsworth. "Meeting the Challenge: Co-ops in the 21st Century." *Rural Cooperatives*, January/February, (2003) pp. 4-6, 36.

2. Glymour, C., R. Scheines, P. Spirtes, K. Kelly. "Discovering Causal Strucuture: Artificial Intellegence, Philosophy of Science, and Statistical Modeling." Orlando, FL: Academic Press, Inc., 1987, pp. 64-178.

3. Harling, K.F., T.F. Funk. "Competitive Strategy for Farm Supply and Grain Elebator Businesses." *American Journal of Agricultural Economics.* 79 (1987): 1077-1082.

4. Hind, A.M. "The Changing Values of the Cooperative and Its Business Focus." *American Journal of Agricultural Economics.* 79(1987): 1077-1082.

5. Hogeland, J.A. "How Business Culture Drives Economic Behavior in Co-ops." *Rural Cooperatives,* January/February, (2004) pp. 23-27.

6. Kyriakopoulos, K., M. Meulenberg, J. Nilsson. "The Impact of Cooperative Structure and Firm Culture on Market Orientation and Performance." *Agribusiness*. 20(2004): 379-396.

7. Nerver, J., S. Slater. "The Effect of a Market Orientation on Business Profitability." *Journal of Marketing.* 54 (1990): 20-35.

8. Pearl, J. *Causality.* New York, NY: Cambridge University Press, 2000, pp. 1-102.

9. Rotan, B.L. "How is Your Cooperative Doing?" *Rural Cooperatives.* January/February, (2004) pp. 30-31.

10. United States Department of Agriculture Rural Business Service (USDA RBS). "State Data 1951-2002." 2003, Accessed on August 25, 2005. *http://www.rurdev.usda.gov/rbs/coops/state1.xls.*

11. Stimpert, J.L., I.M. Duhaime. "Seeing the Big Picture: The Influence of Industry, Diversification, and Business Strategy on Performance." *The Academy of Management Journal.* 40(1997) pp. 560-583.

12. White, R.E., R.G. Hamermesh. "Toward a Model of Business Unit Performance: An Integrative Approach." *The Academy of Management Journal.* 6(1981) pp. 214-223.

13. Zeulli, K. "Evolution of the Cooperative Model." In C.D. Merrett and N. Walzer, ed. *Cooperative and Local Development.* New York, NY: M.E. Sharpe, Inc., 2003, pp. 52-69.