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Managers, Boards, and the Principal-Agent Problem in Cooperatives:

A Survey of Cooperative Managers in Texas

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**Managers, Boards, and the Principal-Agent Problem in Cooperatives:
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Abstracts

The aim of the study is to investigate the possible Principal-Agent (PA) problem between managers and the boards in cooperatives, which no study has examined before. We surveyed 28 cooperative managers in Texas, divided into three sub-category groups, to compare mean differences within a conceptual model. As a result, the investigation yielded no direct evidence of a manager-board PA problem within the survey respondents, which suggests unique characteristics of the PA relationships between managers and the boards in cooperatives compared to investor-oriented firms. Lastly, the comparison revealed behavioral differences between each manager group, which provide implications for cooperative management.

Keywords: Principal-Agent Problem, cooperatives, functional distance, psychological distance, structural distance, social capital, nonparametric bootstrap t-tests

Introduction

The Principal-Agent (PA) problem, also known as the Agency Dilemma or Agency Problem, theorizes the problematic circumstance between two parties due to asymmetric information. The impact of the PA problem arises when agents, who take action on behalf of their principals, maximize their own interests based on private information unknown, or difficult to know, by the principal (Mitnick, 2013). Existing studies point out that the PA problem can be more problematic in cooperatives than investor-oriented firms (IOFs) (Caves & Petersen, 1986; Ferrier & Porter, 1991; Porter & Scully, 1987). This occurs because shareholders of

corporations can monitor management performance of their firms via external information, such as stock exchanges, in order to continually monitor the management performance of their boards (Fama, 1980). However, cooperatives do not have a market for their equity, which hinders their members from monitoring the actions of their managers (Timothy et al., 1998). Accordingly, the lack of monitoring from shareholders may not only lead to a moral hazard where managers incentivize themselves but might also intensify the adverse relationship between the boards and managers if they already had a hostile relationship.

In cooperatives, the boards and managers, who are responsible for managing cooperatives on behalf of its members, can have divergent interests based on their different roles and authorities, which can cause adverse relationships. The board of directors, who are elected by its members, serves its members to achieve the mission of its organization, whereas managers, who are hired by the boards, are responsible for supervising and coordinating cooperatives' business activities under the boards' supervision. Accordingly, they might seek their "own benefit" to retain their position and obtain their own compensation. For example, the boards of directors pursue maximizing members' utilities to maintain their political power, whereas managers might focus on specific management performances to increase their own compensation. Similarly, though both managers and board members should be concerned over the financial stability of their organization, managers might prefer to retain excess cash in the cooperative rather than distribute it to members, while board members may be more likely to support increased cash patronage. Therefore, adverse relationships can occur from various conflicts, such as pursuing different goals, having discrete perspectives of management styles, excessive "micromanagement" by the board members, or insufficient monetary compensation for managers.

The aim of this study is to investigate the potential PA problem between the boards and managers. Though existing studies have shown that adversarial relationships between principles-agents cause the PA problem (Mitnick, 2013; Cobia, 1989), no studies have investigated the possible PA problem in cooperatives between the boards, who have the authority to hire and oversee managers, and managers, who could possibly seek their own compensation. Furthermore, existing studies have provided information to detect the potential PA problem severity and suggestions that may mitigate the PA problem, but most PA research has been related to IOFs or the PA relationship between members and the manager group (the boards and managers) in cooperatives (Timothy et al., 1998). Therefore, we investigate the possible PA problem between the boards and managers in order to extend the boundaries of cooperative studies and provide suggestions about possible hostile relationships between the boards and managers.

Literature Review

Existing PA problem studies provide three factors that play a significant role in the PA problem: incentivizing and monitoring for managers, building organizational environments between principals-agents, and enhancing social capital in organizations.

Many studies have argued the impact of incentivizing and monitoring agents to mitigate the PA problem. Miller (2005) introduced various solutions to the PA problem by reviewing existing principal-agent literature. While the author explained that offering appropriate incentives, enhancing monitoring with appropriate wages for agents, and negotiating between principal-agents are possible solutions for the problem, he also stressed that there is no “unique” solution to the problem. Instead, a different “solution” is needed depending on each organization’s characteristics, such as severity of information asymmetry or relative risk preferences of principal-agents. Similarly, Demougin and Fluet (2001) analyzed the

optimal monitoring-incentive mix model in order to find the trade-off between monitoring and incentives in relation to the PA problem. The authors viewed the PA problem as a function that has inputs, monitoring and incentives, and an output, the effort of agents; thus, it is possible that one of the inputs could be “inferior” depending on the circumstances. To be more specific, the authors examined the optimal monitoring-incentive level with respect to three circumstances: a change of agent’s liability, monitoring cost function, and the effort level required from the agent. As a result, the authors found that if the agent’s liability limit is reduced or monitoring costs increase, the principal uses strong incentives along with less monitoring. The authors also stated that principals can use more monitoring, stronger incentives, or both to induce more effort from agents.

In contrast, Rao (1992) expressed a skeptical perspective toward monitoring and incentive schemes in relation to mitigating the PA problem. The author examined the dynamic PA problem with respect to the conflict that stems from equity. The author stressed that most conventional incentive schemes and monitoring are only effective for cooperative behavior between principals and agents if incentives can be obtained in the first instance unless they share both a large social and cultural climate. Moreover, cooperation between workers and managers to solve the PA problem cannot be sustainable, even if there is no asymmetric information between them. Accordingly, the author suggested prerequisite conditions for a long-term solution: total agreement between principals-agents regarding “the organizational goals, the decision-making process to achieve them, and the pursuit of individual goals in an equitable setting.” In short, existing studies show conflicting opinions regarding incentivizing and monitoring, so there is no omnipotent solution, thus, each solution requires careful consideration of the characteristics of organizations and prerequisite conditions to achieve successful results.

The organizational environment also plays a significant role in the PA problem. Fama and Jensen (1983) viewed organizations as a “nexus of contract,” pointing out the appropriate contract structures that can solve the PA problem. While the authors highlighted the importance of management structures that have separated ownership and control, they argued that separation of decision and risk-bearing functions allows firms to benefit not only from the specializations of management and risk bearing, but also effectively control the PA problem. Similarly, Royer (1999) adapted the Neo-Institutional Theory into cooperatives to address the PA problem. The author asserted that the PA problem could be eliminated by a complete contract that binds the agent’s behavior to the principal’s interests. However, because most contracts are generally imperfect, the PA problem could occur based on moral hazard and defective monitoring. Accordingly, the author stressed that the primary focus to address the PA problem is analyzing appropriate incentive and measurement problems of individual units. Jensen and Meckling (1976) also argued the importance of constructing an environment that reduces Agency Costs, which refers to a sum of “monitoring expenditures by the principal, the bonding expenditures by the agent, and the residual loss.” The authors claimed that laws and sophisticated contracts lead to human behaviors, thus it is imperative to create environments that induce strong incentives for individuals to minimize agency costs. Cobia (1989) stressed that understanding institutional authorities between the boards and managers is crucial. The author argued that a full understanding of responsibilities and authority between the boards and managers is required to have a favorable relationship, which leads to the success of a cooperative. In addition, Napier & Ferris (1993) introduced the idea of Functional Distance, which explains the dyadic distance in the supervisor-subordinate relationship. The authors provided latent variables that potentially affect psychological intimacy and structural environments between principals and agents that are related to agents’ behaviors. The research showed the importance of

building favorable conditions that enhance the relationship between principals and agents. To sum up, Neo-Institutional approaches that focus on building elaborate environments between principal-agents to constrain human behaviors not only require appropriate institutions based on the characteristics of organizations, but also have practical challenges of creating intricate environments.

Lastly, existing studies show that enhancing social capital mitigates the PA problem in cooperatives. Social capital can be defined as “the total of the real or potential resources that are linked to the possession of a lasting network of more or less institutionalized relationships of mutual knowledge or recognition (Bourdieu, 2012, as cited in Saz-Gil et al., 2021).” Saz-Gil et al. (2021) analyzed existing literature about social capital in cooperatives to show the multidimensional nature of the relationship between social capital and cooperatives. The authors described social capital at the intra-firm level as a critical resource to success because it facilitates internal coordination and collective decision-making. Accordingly, social capital decreases transaction costs by diminishing monitoring costs, management costs, and opportunism within an organization. In addition, Gao et al. (2021) investigated American companies to identify relationships between social capital and managers' managerial behaviors and found that increasing social capital not only decreases the chance of managers' illegal use of companies' resources, such as undocumented cash reserves, but also increases investment performance by using an efficient amount of resources. Hoi et al. (2019) also showed how social capital mitigates the PA problem of Chief Executive Officers. The authors pointed out that increasing social capital restrains overcompensation of the CEO and decreases CEOs' power to improve their own compensation. However, the authors commented that they still found pervasive Principal-Agent Problems among companies, which shows that there could be other factors that affect the PA problem other than social capital.

To sum up, while extensive studies have provided feasible solutions for the PA problems, no study has investigated the possible PA problem between cooperative managers and boards. Moreover, no studies have examined hostile environments that could potentially cause the PA problems between cooperative managers and the boards of various types of cooperatives. Therefore, it is necessary to investigate the possible PA problem between cooperative managers and the boards to expand the boundary of the PA studies of cooperatives, as well as provide suggestions for future research.

Potential Principal-Agent Problem between the Boards and Managers in Cooperatives: A Conceptual Model

Based on existing studies, the conceptual model of the PA Problem in Cooperatives is presented in Figure 1. This conceptual model depicts the possible PA problem between the boards (principal) and managers (agents) in cooperatives in order to present the relationship between managers' behavior, given circumstances, and the PA problem. *Functional Distance* and *Social Capital* affect the *Principal-Agent Problem Level* from different groups of cooperatives' managers so that comparisons can be made between manager groups from different types of cooperatives. In this model, we excluded possible intangible outcomes that are affected by the level of the PA problem. The outcome of cooperatives' business is too intricate to enumerate because cooperatives provide not only monetary value to its members, but also offer intangible benefits such as services, prices, assured market, community outreach, and pooling risks (Cobia, 1989). Moreover, it is not appropriate to compare various types of cooperatives with the same output criteria due to their different goals and visions. Furthermore, existing studies show three feasible solutions for the PA problem: increasing incentives and monitoring, fostering appropriate environments, and enhancing social capital. While incentives and monitoring are imperative, existing research has contentious opinions toward

reducing the PA problem through incentives. Thus, the focus here is on the operating environment and social capital in cooperatives, excluding possible incentive variables.

In the conceptual model, *Manager Groups* are divided as such: member/non-member managers, agricultural/non-agricultural cooperative managers, and member/non-member managers separated by type of cooperative. The reason we group the managers is to investigate possible PA problems within heterogeneous managerial behaviors and structural environments. In Agency Theory, agents are assumed to be self-interested employees who want to maximize their own benefit; however, if managers are members of cooperatives and have a commitment to their organizations, the principal-agent relationship between the boards and managers becomes obscure (Zivkovic et al., 2016). Therefore, we hypothesize that member and non-member managers may have different behaviors in terms of the severity of the PA problem.

Similarly, there are many practical differences in operational goals and management between agricultural cooperatives and non-agricultural cooperatives. For example, rural utility cooperatives loosely operate under a not-for-profit mindset, and members do not have a choice in their utility provider, whereas members of agricultural cooperatives actively seek to earn profits from joining cooperatives, and have relatively broader options compared to rural utility cooperatives. Thus, we expect to see behavioral differences from each group, which will shed light on finding indirect evidence of the possible PA problem between managers and the boards in cooperatives, and consequently provide further suggestions to foster a constructive relationship between them.

Functional Distance is a multi-group latent variable that has a positive relationship with the *Potential PA Problem Level* (i.e. shorter *Functional Distance* results in lower *PA Problem Level*), which consists of two latent variables,

Psychological Distance and *Structural Distances*. Napier & Ferris (1993) studied the distance between principal-agents in organizations to present a conceptual model that shows the relationship between distance, subordinates, and organizational outcomes. The authors defined distance in organizations with three different concepts: Psychological, Structural, and Functional. *Psychological Distance* refers to variables that have psychological effects between principal-agents such as demographics, similar values, and perceived power distance between principal-agents. *Structural Distance* depicts both literal physical distance and organizational distance, such as chances to have interactions and degree of centralization between principal-agents. *Functional Distance* refers to overall closeness and quality of the functional working relationship between principal-agents, which is directly affected by *Psychological Distance* and *Structural Distance*. Increasing *Functional Distance* negatively affects subordinate performance and satisfaction, whereas it has a positive relationship with subordinate withdrawal. Therefore, we assume that increasing *Psychological* and *Structural Distance* positively affects the *Potential PA Problem Level*.

Social Capital refers to a latent variable that reduces the *Potential PA Problem Level*, and is composed of observable social capital variables that “measure” how much social capital managers have with their organizations, community, and co-workers by selected proxies. Many existing studies have shown that increasing social capital mitigates the PA problem and can even reduce compensation of CEOs (Saz-Gil et al., 2021; Whiteley, 2000; Gao et al., 2021; Hoi et al., 2019). While the fundamental aspect of measuring social capital is measuring trust (Nilsson et al., 2012), existing studies have stressed the importance of multidimensional methods of measuring social capital (Hong and Sporleder, 2007; Sonboli et al., 2021). Thus, the *Social Capital* latent variable is composed of explanatory variables, such as the level of trust between employees, sense of

belonging at their workplace, sense of solidarity among their community, and two variables that measure their loyalty toward their workplace.

Lastly, the *Potential PA Problem Level* shows a latent variable explaining variables that potentially induce the PA problem between the boards and managers. Existing studies show that mainly asymmetric information and adversarial relationships between principles-agents cause the PA problem (Mitnick, 2013; Cobia, 1989). Therefore, the latent variable is composed of explanatory variables, such as the level of asymmetric information, trust level, and closeness between the boards and managers, in order to illustrate the severity of the PA problem in cooperatives.

Methods and Procedures

Survey/Data

To examine the conceptual model, a survey targeting various types of cooperatives in Texas was used to gather base data. Manager groups were chosen from the Texas Agricultural Cooperative Council (TACC), a voluntary statewide industry association that was created by Texas cooperatives in 1934. The TACC is made up of a variety of cooperatives, including agricultural and non-agricultural cooperatives, which makes it an ideal organization for comparing different types of cooperatives within the conceptual model.

Research data was collected in two steps. First, we conducted in-person pilot surveys at the TACC's Managers' Conference, held July 13-15, 2022, in Ruidoso, New Mexico. We interviewed randomly chosen cooperative managers and TACC staff to obtain their opinions about the validity of the proposed survey questions and the relationship between managers and their boards. After our survey questionnaires were updated based on the feedback, the survey was conducted anonymously from early August to mid-September 2022. We emailed an online

survey link to 147 TACC cooperatives managers and an additional 61 non-TACC cooperatives managers from the 2022 TACC Directory & Handbook to inquire about perceptions towards their boards and organizations, along with their demographics and organizations' financial performance. During the survey period, we sent four group emails, two individual emails, and the Executive Vice President of the TACC emailed all the members as well. To encourage the managers' participation, we offered a \$100 Amazon gift card to a randomly chosen participant. By the end of the survey period, we obtained 28 complete responses.

Table 1 shows items of four latent variables, *Psychological Distance* and *Structural Distance*, which explain *Functional Distance*, *Social Capital*, and *Potential PA Problem Level*, in the conceptual model and questions that were asked to managers to elicit responses to these latent variables. Survey questions were created based on the survey form from an existing study (Zivkovic et al., 2017) and literature reviews that were referenced in the conceptual model. First, *Functional Distance* consists of two latent variables: *Psychological Distance* and *Structural Distance*. *Psychological Distance* is provided here by three items: *Value Similarity*, *Demographic Similarity*, and *Power Distance*. Each item measures how managers perceive that level of psychological closeness or relative power with the board.

Structural Distance consists of five items: *Physical Distance*, *Interaction Opportunities*, *Centralization*, *Managerial Distance*, and *Strategic planning*, which measure how managers perceive their structural work environment between themselves and the boards. Though the boards and managers have their distinguished roles in strategic planning and operational decisions, respectively, we attempted to measure the levels of centralization, independence, and interactions between the two parties to identify if they are independent administrative partners that help each other within their boundaries, or a subordinate-supervisor relationship to "measure" the potential PA problem.

Social Capital, which is believed to decrease the PA problem, consists of five items: *Trust between Employees*, *Sense of Belonging*, *Social Cohesion*, and two items of *Loyalty for Organization*. These items proxy the social intimacy between managers and their organization and community. Lastly, *Principal-Agent Problem Level* consists of five items: *Trust Level toward Board Chair*, *Trust Level toward Board Members*, *Asymmetric Information*, *Conflict Level*, and *Closeness with Boards*. Because it is onerous or even impossible to directly measure the level of PA problem, respondents were asked about the factors that potentially affect the PA problem based on proxies used in previous literature (Mitnick, 2013; Cobia, 1989). The items measured how the managers perceive the relationship between themselves and the boards, and current management circumstances that potentially cause the PA problem.

Research Methods

The 28 survey respondents were sorted into three pairs of subcategories based on the managers' characteristics and types of cooperatives in order to compare managers within the conceptual model (Table 2 and Figure 2). Subcategory 1 consisted of 9 managers who were current members of their organizations and 19 non-member managers. Similarly, Subcategory 2 had 17 managers who worked in agricultural cooperatives, and 11 managers who worked in non-agricultural cooperatives. The responses were primarily from managers of cotton gin and rural electric cooperatives. Lastly, we organized them into three subcategories, current member (9) and non-member (19) managers, agricultural cooperative managers and non-agricultural cooperative managers, and member and non-member manager groups in both agricultural and non-agricultural cooperatives. Accordingly, we compared the mean difference of the three different subcategories, which have contrasting characteristics, to find indirect evidence of the possible PA problem between managers and the boards in cooperatives.

For the mean comparison between manager groups, we conducted three different tests, two-sample t-tests (H_0 : The difference in group means is zero), Wilcoxon rank-sum tests (H_0 : Two populations are equal), and Nonparametric bootstrap t-tests (H_0 : The means of the underlying distributions are the same), between manager groups based on the result of the 0 to 10 range Likert scale questionnaire. This method was used because existing studies have shown conflicting suggestions about using parametric vs. nonparametric tests for small sample hypothesis tests (Weber & Sawilowsky, 2009; Bridge & Sawilowsky, 1999; Tanizaki, 1997; Janusonis, 2009; Winter, 2013; Zimmerman & Zumbo, 1992). Therefore, we provided three different tests: two-sample t-test for the parametric tests and Wilcoxon rank-sum test and Non-parametric bootstrap t-test for non-parametric tests. While the two-sample t-test and Wilcoxon rank-sum test are commonly used for comparing two independent samples, we also conducted a Non-parametric bootstrap t-test due to its advantages for small sample studies. Dwivedi et al. (2017) emphasized that the Non-parametric bootstrap t-test has equal or more power than a normal t-test and is advantageous for controlling Type I Error. Moreover, because it is a resampling method, this test is useful for small or even extremely small sample sizes. Lastly, we used *R* for the Non-parametric bootstrap t-test and *STATA 17* for the other tests.

Results

General Characteristics of Responding Managers

Table 3 presents the general characteristics of responding managers and their cooperatives. The sample consists of 11 non-agricultural cooperative managers and 17 agricultural cooperative managers. They were all fully employed managers (working 40+ hours a week), mostly male, aged 45-64 years old, White, college-educated, and had an average of 17 years of work experience. The manager groups answered that they could confidently explain the business model differences between cooperatives and IOFs with an average of 9.036 out of 10 on the Likert scale (0: Not at all - 10: Extremely confident). Their cooperatives were generally mid-sized and had an average of 94 full-time workers and 18,953 members. In addition, the manager groups' cooperatives generally had good financial performance with an average 9.8% Return on Assets (ROA) and 54.5% Return on Equity (ROE). Overall, the sample represents managers from a wide range of types and sizes of cooperatives.

Subcategory 1: Comparison of All Member Managers vs All Non-member Managers

In the conceptual framework, we hypothesized that member managers would have less prevalence of PA problems relative to non-member managers because, as its name suggests, member managers are also members (principals) of their organizations. However, when comparing all member managers (n = 9) to all non-member managers (n = 19), the test results show that member managers' *Potential PA Problem Level* is generally higher than non-member managers, which is contrary to what we expected (Table 4). For example, non-member managers have a higher *Trust Level toward Board Members* than member managers, and along with less *Conflict Level* than member managers. Furthermore, the comparison results of *Psychological Distance* show that all non-member managers tend to have

higher *Value Similarity* and *Demographic Similarity* with their boards compared to member managers. These results suggest the possibility that non-member managers were more likely to be hired by their boards with higher *Value Similarity* and *Demographic Similarity*, whereas *Value Similarity* and *Demographic Similarity* might not be determinant factors to hire member managers since they are already members of their respective cooperatives. Nevertheless, besides *Psychological Distance*, the other latent variables (*Structural Distance* and *Social Capital*) are not statistically significant to associate with the result of the *Potential PA Problem Level* in the conceptual model. Thus, the overall results did not fully support the existence of a manager-board PA problem.

Subcategory 2: Comparison of Agricultural Cooperative Managers vs Non-agricultural Cooperative Managers

Comparing agricultural cooperative managers (n = 17) and non-agricultural cooperative managers (n = 11) reveals complex results in the conceptual model (Table 4). In general, multiple items in both *Structural Distance* and *Potential PA Problem Level* indicate that there are statistical differences between the two groups. In *Structural Distance*, agricultural cooperative managers experience a significantly higher frequency of non-social outside-of-board meetings, or board members visiting their office, compared to non-agricultural cooperative managers. Consequently, agricultural cooperative managers have lower *Managerial Distance* compared to non-agricultural cooperative managers, which suggests agricultural cooperative managers may feel less independent in terms of administrative or managerial work. In addition, agricultural cooperative managers have less social interaction with their boards compared to non-agricultural cooperative managers. Comparing items of the *Potential PA Problem Level* shows that the agricultural cooperative managers and their boards share more information, but also experience a higher frequency of conflict during board meetings than non-agricultural

cooperative managers. Since the level of *Physical Distance* for agricultural cooperative managers is much higher than non-agricultural cooperative managers, higher *Asymmetric Information* is understandable, but their higher *Conflict Level* is contrary to the expected signs indicating a possible PA problem.

Sub-category 3: Comparison of Member Managers vs Non-member Managers Separated by Type of Cooperative

Lastly, we compared member and non-member managers in each group, agricultural and non-agricultural cooperatives, to scrutinize each manager's characteristics (Table 5). Comparing member (n = 5) and non-member managers (n = 6) in non-agricultural cooperative groups shows that there is no statistical difference between the two groups. Similarly, comparing member (n = 4) and non-member managers (n = 13) in the agricultural cooperative group also reveals that most of the items are statistically insignificant, aside from some of the items in *Social Capital* and *Potential PA Problem Level*.

In *Social Capital*, Non-parametric bootstrap t-test results indicate that member managers of agricultural cooperatives have the highest level (10 out of 10) in both *Sense of Belonging* and *Loyalty for Organization* with $p = 0.038$ and $p = 0.012$, respectively. These results imply that the member managers of agricultural cooperatives have a strong sense of belonging and loyalty to their workplace. However, comparing items in the *Potential PA Problem Level* shows contrary results to the expected signs indicating a PA problem. Though the member managers have the highest levels of *Sense of Belonging* and *Loyalty for Organization*, the comparison results in *Potential PA Problem Level* indicate that the member managers likely have hostile relationships with their boards. For example, the two-sample t-test results show that member managers have much lower trust levels toward their board members and chair compared to non-member managers. Moreover, the member managers have a significantly higher *Conflict*

Level compared to non-member managers, 7.25 versus 1.615 out of 10 with results of $p = 0.001$, $p = 0.004$, and $p = 0.001$ from all three mean comparison tests. We further investigated the details of these member managers to see if there are common demographic or organizational characteristics that possibly affect their *Conflict Level*. As a result, we found that the four member managers from different types of cooperatives have different ranges of revenues, number of employees, and number of members, along with different age and education levels (Table 6). Therefore, the comparisons between member ($n = 4$) and non-member managers ($n = 13$) in the agricultural cooperative group show contrary results to the expected signs indicating a possible PA problem, and despite the high *Social Capital* of the member managers, they appear to experience hostile relationships with their boards and chair while they share no other common characteristics besides being members.

Discussion

While previous research has investigated the possibility of a PA problem between cooperative managers and members, we speculated that there could be an additional PA problem between cooperative managers and board members. We also hypothesized that manager-board PA problems would be less prevalent if the managers are also members of the cooperative. We therefore investigated differences between the survey responses of member and non-member managers for indirect evidence of a manager-board PA problem.

As a result, that investigation yielded no evidence of a manager-board PA problem within the responding managers or in sub-categories separated by type of cooperative, which suggests unique characteristics of principal-agent relationships between managers and the boards in cooperatives compared to other principals-agents in IOFs. In addition, the comparisons revealed different characteristics between manager groups. For example, comparing agricultural cooperative managers and non-agricultural managers shows that managers and the boards of

agricultural cooperatives have more business-oriented (non-social) interactions and share more information compared to non-agricultural cooperatives. However, managers of non-agricultural cooperatives have more managerial independence and social interactions with their boards compared to agricultural cooperatives, which shows the structural difference between the two types of cooperatives.

Furthermore, the comparison of member managers and non-member managers separated by type of cooperative (Table 5) suggests some possible instances of internal governance issues and structural characteristics that may lead the member managers of agricultural cooperatives, who are both principals and agents, to have high a *Potential PA Problem Level*, despite the high *Social Capital*. Because becoming a board member does not necessarily require board candidates to have certified business management skills, the board of directors' management knowledge, such as understanding of governance management or sector of supply chain, is often questioned (Park et al., 2019). In this case, conflict may arise due to the board's lack of perceived knowledge if board members attempt to over-manage managers' boundaries. Moreover, if non-member board members, who potentially have a lack of knowledge about their cooperative's sector of the supply chain, influence cooperatives' investment decisions, then conflict may arise in a similar way. Lastly, if the board members seek their own benefit (i.e. maximizing equity for its members to pursue their own political power by minimizing management costs, including managers' monetary benefits) rather than the mutual benefit of all management employees, conflict may arise. Particularly, agricultural cooperatives distribute a higher portion of patronage in the form of cash. This may create conflicts between patronage distributions and the cooperative's cash flow, whereas rural electric cooperatives tend to distribute all patronage in the form of capital credits (retained patronage). Thus, the balancing act between patronage and the cooperative's cash flow is less substantial than in agricultural cooperatives. For

these reasons, latent variables indicating the comprehensive behaviors of the board of directors, such as their understanding of equal governance between managers and the board, the presence of non-user directors, the relationship between the number of consecutive years as a board member and the amount of equity distributions, and the type of cooperatives, should be considered to fully explain the potential PA problems between the boards and managers.

Lastly, one noteworthy difference between the agricultural and non-agricultural cooperative groups is the number of choice options for members to join. For example, rural electric cooperatives, including member-managers, do not have a choice over where they source their electricity, they are simply assigned to the local area's utility providers. This discrepancy in the number of choice options from the agricultural and non-agricultural cooperatives may affect not only the members, but also their managers' commitment or understanding of their organization.

Research Limitations and Suggestions for the Future Research

As we dive into the details of our research, it is important to recognize and discuss the natural limitations that affect how far we can apply our findings. We provided three different hypothesis test results to validate the statistical tests with a small sample size, but the insufficient sample size of this study may cause different results outside of cooperatives in Texas depending on a cooperatives' region, culture, or members' heterogeneity. Similarly, since there were no similarities between the four agricultural cooperative member-managers, the suggested possible reasons for their noticeably high *Conflict Level* and constraint factors for efficient communications between them and their boards should be independently analyzed depending on the unique environment of each cooperative. Lastly, because all of the agricultural cooperative member managers indicated that they worked more than 40 hours a week at their respective cooperatives, their work

hours may limit any farming activities. Accordingly, their membership relationship with the cooperative may not have been significant. In retrospect, possible ambiguity in some survey questions could have affected our results. Our measures of power distance, structural distance and asymmetric information did not reflect the divisions of responsibility between the boards and managers. Survey respondents reporting imbalance in those areas could have reflected the differences in the manager and board roles rather than an unbalanced board-manager relationship. In addition, we argued the hostile relationship between member managers and the boards in agricultural cooperatives based on the results of *Trust Level toward Board chair*, *Trust Level toward Board members*, and *Conflict Level*. However, our survey question on conflict rated the frequency of conflict in board meetings, therefore it did not distinguish between conflict among board members and manager-board conflict.

In conclusion, the existing gap in research emphasizes the necessity for additional studies addressing the prospect of a possible PA problem between managers and the board in cooperatives. One possible approach would be to measure potential PA problems directly by surveying both managers and board members to determine if their objectives for the cooperative are congruent. An even more ambitious approach would be to compare the objectives of the managers, boards of directors, and members of a larger sample of cooperatives. Lastly, the direct and indirect relationships between variables could be specified and estimated by Structural Equation Modeling with an adequate sample size.

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Figure 1. Conceptual Framework of the Study

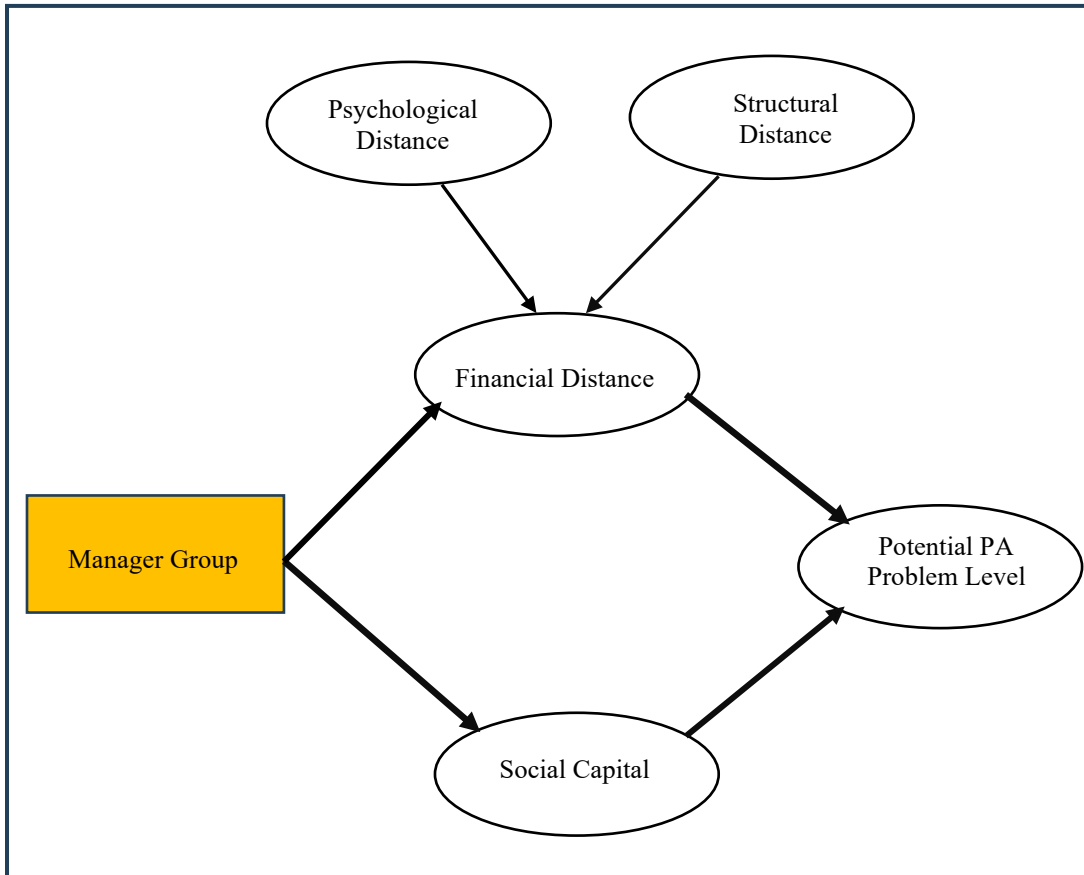


Figure 2. Conceptual Framework with 18 Survey Questions

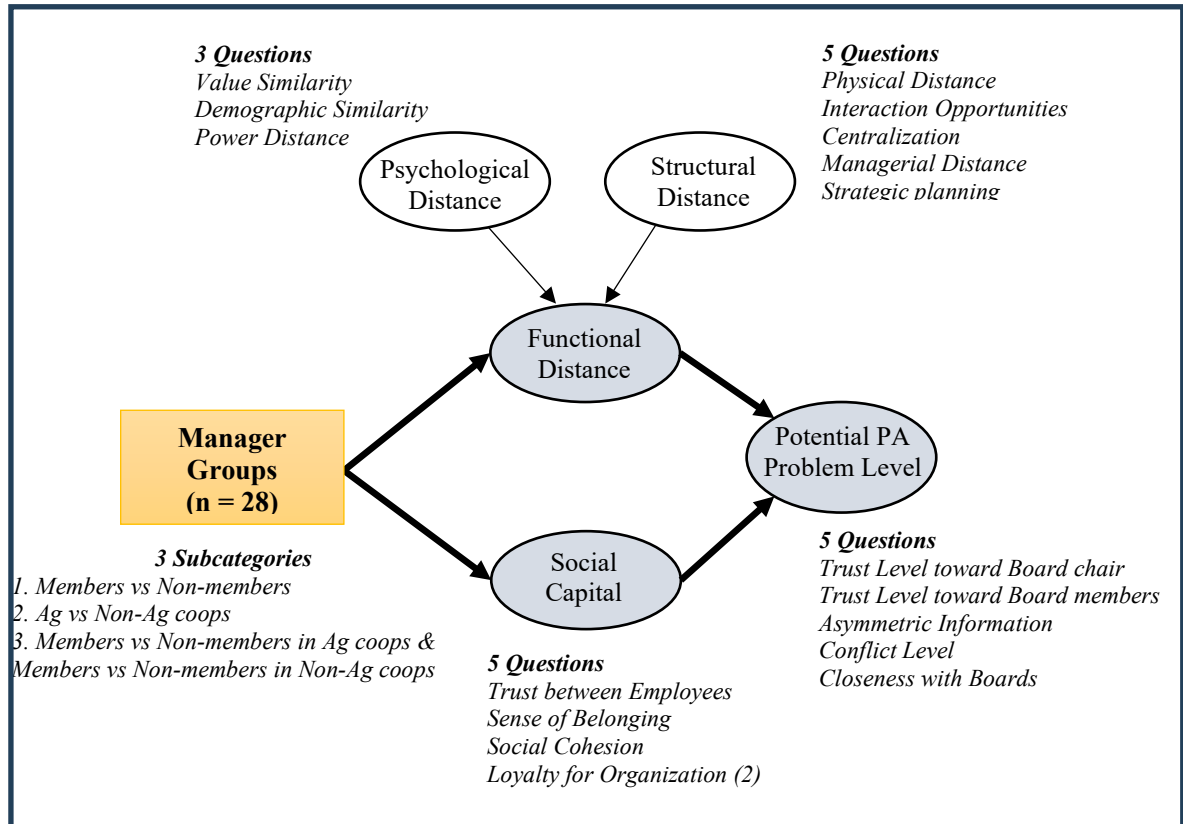


Table 1. Items of Latent Variables & Corresponding Survey Questions

Variables	Definitions	Questions
Psychological Distance (3 questions)		
<i>Value Similarity</i>	Overall similarities of values from culture, religion, and attitudes with the boards	Do you think you and the board members are generally similar in terms of culture, religion, beliefs, and attitudes?
<i>Demographic Similarity</i>	Overall similarities of age, gender, and race with the boards	Do you think you and the board members are generally similar in terms of age, gender, and race?
<i>Power Distance</i>	How managers perceive discrepancies in their power compared to the boards	When comparing the relative power in actually (not theoretically) making managerial decisions between you and the board, would you say that you have same power as the board?
Structural Distance (5 questions)		
<i>Physical Distance</i>	Physical distance (desk to desk) between the boards and managers in organization	Outside of board meetings, how often are board members present in your office(s) for business (non-social) purposes?
<i>Interaction Opportunities</i>	Frequency of opportunities for social contact and accessibility with the boards	Do you think you have enough opportunities for social contact and accessibility to the board's members?
<i>Centralization</i>	Level of strategic decision-making centralization in organization	Between board members and managers, do you think everyone has an equal influence on the strategic decision-making process in your organization?
<i>Managerial Distance</i>	Level of independence of managers from boards	How much independence from daily board oversight do you feel like you have to complete administrative/managerial work?
<i>Strategic planning</i>	Strategic planning communication frequency between managers and the boards	Do you and boards frequently discuss strategic plans for your organization together?

Table 1. Items of Latent Variables & Corresponding Survey Questions (cont.)

Social Capital (5 questions)		
<i>Trust between Employees</i>	Level of trust between employees	Please rate the level of trust you feel between you and your co-workers/employees.
<i>Sense of Belonging</i>	Level of sense of belonging at your current workplace	How strong is your sense of belonging in your organization?
<i>Social Cohesion</i>	Level of the sense of solidarity among your community	How connected are you to the community surrounding your workplace?
<i>Loyalty for Organization (2)</i>	Level of loyalty for current workplace	1. How loyal are you to your workplace? 2. If another firm was to offer you a 10% higher salary, how likely are you to seriously consider that offer if your current firm does not match that offer?
Potential PA Problem Level (5 questions)		
<i>Trust Level toward Board chair</i>	Level of trust between managers and the chair of boards	Please rate the level of trust you feel between you and the Chair of your board.
<i>Trust Level toward Board members</i>	Level of trust between managers and boards	Please rate the level of trust you feel between you and the other members of the board.
<i>Asymmetric Information</i>	Level of asymmetric information between managers and boards	Do you think the amount of information that you and board members have regarding cooperative management and daily work are the same?
<i>Conflict Level</i>	Frequency of conflicts between managers and boards	Are your board meetings contentious or subject to frequent conflicts?
<i>Closeness with Boards</i>	Overall level of closeness that managers feel towards boards	On a personal level, how emotionally close do you feel to your board?

Table 2. Subcategories of Responding Managers

Managers (n=28)		Sub-category 2	
		Ag Co-op (n = 17)	Non-Ag Co-op (n = 11)
		Sub-category 3	Sub-category 3
Sub-category 1	Current member (n = 9)	- Cotton Ginning Services:2 - Grain Marketing: 1 - Livestock Feed Sales: 1	- Electricity Sales: 5
	Non-Member (n = 19)	- Cotton Ginning Services: 11 - Grain Marketing: 2	- Electricity Sales: 5 - Telephone and Broadband Services: 1

Table 3. Characteristics of responding managers and their organizations

Cooperative type ¹						
Marketing cooperative	Supply (purchasing) cooperative		Service cooperative		Non-agricultural cooperative	
4	2		11		11	
Cooperatives' status						
(2019-2021, \$, %, a person)	Mean	Std. Dev.		Min	Max	
Average patrons equity	69,687,787	1.505e+08		226000	7.628e+08	
Average total assets	158,531,524	3.725e+08		2,470,404.3	1.914e+09	
Average current assets	16,973,323	24,583,865		390,383	99,257,595	
Average current liabilities	18,189,014	36,194,113		39,885.333	1.752e+08	
Average net margin	6,076,981.4	9,201,253.8		17	41,658,994	
ROA ²	9.804	8.363		0	25.822	
ROE ³	54.474	122.286		0	633.91	
Current Asset ratio ⁴	3.384	8.426		0.47	45.359	
The numbers of full-time employees	93.536	176.222		2	900	
The numbers of members	18,953.321	71,617.231		35	378,259	
Managers						
	Mean	Std. Dev.		Min	Max	
The years of serving at current workplace	17.232	10.263		0.5	37	
Understanding level of cooperative business model ⁵	9.036	1.261		5	10	
Age	25-34	35-44	45-54	55-64	65-74	75-84
	3	2	10	8	4	1
Gender	Male			Female		
	27			1		
Education	Less than a high school diploma	High school degree or equivalent		Bachelor's degree (e.g. BA, BS)	Master's degree (e.g. MA, MS, MEd)	
	1	2		17	8	
Ethnicity	White/Caucasian			Prefer not to say		
	27			1		
Members of cooperatives(Y/N)	Currently member			Not a member		
	9			19		

1: Multiple choices were allowed

2: Return on assets (ROA) = Net Margin/Total Assets

3: Return on equity (ROE) = Net Margin/Total Equity

4: Current asset ratio = Current assets/Current liabilities

5: Evaluated based on the question: How confidently can you explain the business model differences between cooperatives and investor-owned companies? (0: Not at all - 10: Extremely confident)

Table 4. Comparisons of All Member Managers vs All Non-member Managers and Agricultural Cooperative Managers vs Non-agricultural Cooperative Managers

Variables	Member (9)		Non-member (19)		p-values			Ag co-op (17)		Non-Ag co-op (11)		p-values			
	Mean	Std. Dev.	Mean	Std. Dev.	a	b	c	Mean	Std. Dev.	Mean	Std. Dev.	a	b	c	
Psychological Distance															
<i>Value Similarity</i> (0: Not at all - 10: Extremely similar)	7.556	1.509	8.526	1.646	0.147	0.033	0.121	8.294	1.863	8.091	1.300	0.756	0.351	0.754	
<i>Demographic Similarity</i> (0: Not at all - 10: Extremely similar)	5.778	1.787	7.158	2.089	0.100	0.076	0.067	7.177	2.038	6.000	2.000	0.145	0.142	0.142	
<i>Power Distance</i> (0: Not similar at all - 10: Exactly the same)	6.444	2.877	7.842	2.193	0.166	0.160	0.201	7.941	1.560	6.545	3.358	0.147	0.485	0.213	
Structural Distance															
<i>Physical Distance</i> (0: Never - 10: Always)	3.222	2.333	3.316	2.945	0.934	0.912	0.931	4.706	2.592	1.091	0.701	0.000	0.000	0.000	
<i>Interaction Opportunities</i> (0: Not at all - 10: Extremely)	7.667	1.000	8.000	2.381	0.692	0.201	0.623	7.471	2.239	8.546	1.508	0.087	0.180	0.154	
<i>Centralization</i> (0: Not at all - 10: Extremely equal)	6.556	2.242	7.579	2.090	0.248	0.243	0.245	7.412	1.873	7.000	2.608	0.630	0.808	0.671	
<i>Managerial Distance</i> (0: No independence - 10: Complete independence)	8.889	1.269	9.158	0.958	0.537	0.719	0.562	8.824	1.015	9.455	1.036	0.062	0.086	0.113	
<i>Strategic planning</i> (0: Never - 10: Always)	7.667	2.739	8.105	1.729	0.609	0.976	0.682	8.059	1.819	7.818	2.483	0.769	0.959	0.781	
Social Capital															
<i>Trust between Employees</i> (0: None - 10: Extremely)	8.333	0.866	8.947	0.911	0.103	0.108	0.101	8.824	0.951	8.636	0.924	0.612	0.693	0.567	
<i>Sense of Belonging</i> (0: No sense of belonging - 10: Complete sense of belonging)	9.556	0.727	9.579	0.693	0.935	1.000	0.947	9.706	0.588	9.364	0.809	0.206	0.294	0.221	
<i>Social Cohesion</i> (0: Not at all - 10: Extremely)	8.111	1.054	7.579	2.479	0.545	1.000	0.458	7.294	2.444	8.455	1.293	0.161	0.192	0.122	
<i>Loyalty for Organization</i> (0: Not at all 10:Extremely)	1 (higher is more loyal)	9.778	0.441	9.526	0.612	0.281	0.473	0.226	9.588	0.618	9.636	0.505	0.831	1.000	0.799
	2 (lower is more loyal)	1.889	1.833	2.579	2.673	0.492	0.655	0.439	2.706	2.640	1.818	2.041	0.353	0.361	0.324
Potential PA Problem Level															
<i>Trust Level toward Board chair</i> (0: None - 10: Extremely)	8.556	1.944	9.368	0.684	0.111	0.369	0.231	8.882	1.495	9.455	0.688	0.247	0.370	0.195	
<i>Trust Level toward Board members</i> (0: None - 10: Extremely)	8.333	1.118	9.158	0.898	0.046	0.054	0.055	8.882	1.166	8.909	0.831	0.948	0.817	0.933	
<i>Asymmetric Information</i> (0: Not at all - 10: Exactly the same)	3.222	2.224	4.842	3.563	0.224	0.275	0.158	5.588	2.785	2.364	3.009	0.008	0.005	0.006	
<i>Conflict Level</i> (0: Never - 10: Always)	3.889	3.551	1.421	2.219	0.033	0.042	0.059	2.941	3.326	1.091	1.640	0.100	0.205	0.055	
<i>Closeness with Boards</i> (0: Not close at all - 10: Extremely close)	7.333	1.803	7.211	1.475	0.850	0.871	0.857	7.529	1.463	6.818	1.662	0.244	0.221	0.226	

a: Two-sample t-test, b: Wilcoxon rank-sum test, c: Non-parametric bootstrap t-test (number of bootstrap replicates: 1,000)

Table 5. Comparison of Member Managers vs Non-member Managers Separated by Type of Cooperative

Variables	Ag co-op group (n = 17)							Non-Ag co-op group (n = 11)							
	Member (4)		Non-member (13)		p-values			Member (5)		Non-member (6)		p-values			
	Mean	Std. Dev.	Mean	Std. Dev.	a	b	c	Mean	Std. Dev.	Mean	Std. Dev.	a	b	c	
Psychological Distance															
<i>Value Similarity</i> (0: Not at all - 10: Extremely similar)	7.000	2.160	8.692	1.653	0.114	0.095	0.141	8.000	0.707	8.167	1.722	0.845	0.589	0.834	
<i>Demographic Similarity</i> (0: Not at all - 10: Extremely similar)	6.250	0.957	7.462	2.222	0.314	0.198	0.134	5.400	2.302	6.500	1.761	0.392	0.455	0.372	
<i>Power Distance</i> (0: Not similar at all - 10: Exactly the same)	7.750	0.500	8.000	1.780	0.789	0.499	0.673	5.400	3.647	7.500	3.082	0.327	0.364	0.312	
Structural Distance															
<i>Physical Distance</i> (0: Never - 10: Always)	5.500	1.291	4.462	2.876	0.501	0.690	0.357	1.400	0.548	0.833	0.753	0.196	0.377	0.165	
<i>Interaction Opportunities</i> (0: Not at all - 10: Extremely)	7.000	0.817	7.615	2.534	0.646	0.273	0.496	8.200	0.837	8.833	1.941	0.517	0.134	0.465	
<i>Centralization</i> (0: Not at all - 10: Extremely equal)	7.000	2.582	7.539	1.713	0.631	0.716	0.723	6.200	2.168	7.667	2.944	0.381	0.208	0.374	
<i>Managerial Distance</i> (0: No independence - 10: Complete independence)	8.250	0.957	9.000	1.000	0.206	0.244	0.207	9.400	1.342	9.500	0.837	0.883	1.000	0.895	
<i>Strategic planning</i> (0: Never - 10: Always)	8.750	1.258	7.846	1.951	0.402	0.445	0.309	6.800	3.421	8.667	1.033	0.232	0.584	0.273	
Social Capital															
<i>Trust between Employees</i> (0: None - 10: Extremely)	8.500	1.291	8.923	0.862	0.454	0.626	0.556	8.200	0.447	9.000	1.095	0.163	0.091	0.136	
<i>Sense of Belonging</i> (0: No sense of belonging - 10: Complete sense of belonging)	10.000	0.000	9.615	0.650	0.266	0.601	0.038	9.200	0.837	9.500	0.837	0.568	0.719	0.574	
<i>Social Cohesion</i> (0: Not at all - 10: Extremely)	8.250	1.500	7.000	2.646	0.388	0.593	0.246	8.000	0.707	8.833	1.602	0.312	0.242	0.262	
<i>Loyalty for Organization</i> (0: Not at all 10:Extremely)	1 (higher is more loyal)	10.000	0.000	9.462	0.660	0.132	0.277	0.012	9.600	0.548	9.667	0.516	0.840	1.000	0.915
	2 (lower is more loyal)	1.750	1.258	3.000	2.915	0.425	0.693	0.256	2.000	2.345	1.667	1.966	0.803	0.740	0.813
Potential PA Problem Level															
<i>Trust Level toward Board chair</i> (0: None - 10: Extremely)	7.500	2.517	9.308	0.751	0.029	0.115	0.138	9.400	0.894	9.500	0.548	0.824	1.000	0.831	
<i>Trust Level toward Board members</i> (0: None - 10: Extremely)	8.000	1.414	9.154	0.987	0.083	0.120	0.151	8.600	0.894	9.167	0.753	0.283	0.342	0.296	
<i>Asymmetric Information</i> (0: Not at all - 10: Exactly the same)	4.750	2.363	5.846	2.940	0.509	0.517	0.484	2.000	1.225	2.667	4.083	0.735	0.723	0.718	
<i>Conflict Level</i> (0: Never - 10: Always)	7.250	2.062	1.615	2.364	0.001	0.004	0.001	1.200	1.304	1.000	2.000	0.853	0.589	0.854	
<i>Closeness with Boards</i> (0: Not close at all - 10: Extremely close)	8.250	1.708	7.308	1.377	0.273	0.307	0.343	6.600	1.673	7.000	1.789	0.713	0.771	0.701	

a: Two-sample t-test, b: Wilcoxon rank-sum test, c: Non-parametric bootstrap t-test (number of bootstrap replicates: 1,000)

Table 6. Member-mangers and their Agricultural Cooperatives' Details

Main revenue sources	Total revenue for the past three years	Number of employees	Number of members	Age	Education
Sales of Livestock Feeds	\$20,000,000 - \$25,000,000	45	2,500	25-34	Bachelor's degree
Cotton Gin	\$100,000 - \$500,000	4	35	55-64	Less than a high school diploma
Grain, Agronomy, & Petroleum	More than \$35,000,000	150	4,174	45-54	Bachelor's degree
Cotton gins, Cotton Warehouses, Grain Elevators, Cottonseed Storage, Feed and Farm Supply Sales and Services	More than \$35,000,000	108	1,160	75-84	Bachelor's degree