

# Board Structure Variety in Cooperatives

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**Abstract.** This paper investigates why agricultural cooperatives exhibit different principles for the allocation of decision rights between the Board of Directors and the Management. A mass-action interpretation of the Nash equilibrium in an investment proposal game shows that, on the one hand, board structure variety is an equilibrium outcome while, on the other, the Traditional model (the board has full control) and the Management model (the professional management makes up the Board of the cooperative society) perform better than the Corporation model (the Management is in full control of the cooperative firm).

Keywords: Internal governance, Board of Directors, Management, decision rights, game theory.

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*'Problems with governance usually do not stem from member issues but, more likely, board-management relations.'* (Anderson 1994, p. 60)

## **1 Introduction**

This paper concerns the different governance models (henceforth “board models” or “board structures”) of agricultural cooperatives. Board models differ in the way the Board of Directors delegates tasks and responsibilities to the professional managers. The aim of this study is to investigate why agricultural cooperatives exhibit different principles for the allocation of decision rights between the Board of Directors and the Management.

It is observed that different board models exist in cooperatives at the same time and even in similar markets (Bijman et al. 2013; Chaddad and Iliopoulos 2013; Bijman et al. 2014). This observation gives rise to several questions: (1) Why do different board models co-exist – why does one board model not outcompete the others? (2) Is any board model better or poorer when it comes to satisfying member interests, and if so, how? Answers to these questions may be valuable contributions to the knowledge of the internal governance of cooperatives. Research within this field has to a large extent been based on agency theory, property rights theory and various behavioral approaches, while formal economic theorizing has been missing.

The two questions are addressed in an investment proposal game between the Board (representing the members) and Management (Myerson 2004, 2009). The Board as well as the Management chooses whether to propose an investment project. This is unproblematic as long as only one party comes forward with the proposal, but it results in a problem when neither of the parties formulate a proposal, i.e., inertia, or both parties formulate a proposal, i.e., duplication. Nash equilibria can be interpreted in a rationalistic or mass-action way (Kuhn et al. 1996). The rationalistic interpretation entails that the players choose the strategies that belong to the Nash equilibrium. This paper adopts the mass-action interpretation of Nash equilibrium, which entails that the equilibrium mixed strategy is a population-statistical distribution of the board models. This model is able to capture the fact that board structure variety is an equilibrium outcome and thus also determine whether models with either Board or Management control serve the member interests better compared to the Corporation control model.

The article is organized as follows. Section 2 presents the conceptual framework concerning cooperative board models. This is followed by an

account of the model in Section 3. Section 4 comprises a discussion of the results, and conclusions are formulated in Section 5.

## **2 Cooperative board models**

### ***Classes of cooperative board models***

A cooperative is an enterprise that is owned and controlled by parties (patrons) who sell products to the firm or buy from it. The patrons are organized in a society of members and elect a Board of Directors representing them in decision making. Boards have the authority to decide about their cooperative's investments, but they may allocate more or less of the decision power to another party, most likely the professional managers (Aghion and Tirole 1997; Baker et al. 1999). Hence there are different ways of allocating the responsibilities between the governing bodies. A *cooperative board model* determines the relative power of the Board of Directors and the professional Management when it comes to deciding about investments.

The present study deals with a categorization of cooperatives in terms of board models, which are based on decision rights. Other researchers have classified cooperatives on the basis of property rights. The two ways of categorizing cooperatives are not identical but they are related, because there is often control right variety for a given allocation of ownership rights. Thus, researchers have presented a wide range of cooperative organizational models (Nilsson 1999; Chaddad and Cook 2004; Chaddad and Iliopoulos 2013; Grashuis and Cook 2017). The range of models stretches from the traditional one, which is characterized by collective ownership and full member control, to various hybrid models, which may have property rights in the hands of individual members as well as external ownership and control rights by non-members (Hess et al. 2013; Grashuis 2018). In between these extremes there are variants as well as combinations, which means that it may be difficult to identify a cooperative's board model on the basis of its organizational chart. For example, the Management may have considerable influence in a traditional cooperative. Likewise, Management has an interest in satisfying member interests, because it wants to ensure that sufficiently large volumes of products are delivered (Hakelius and Nilsson 2020; Morfi et al. 2021).

Just as there are differences between investor-owned and cooperative firms as concerns behavior and performance, differences exist between cooperatives with different board models (Hendrikse and Van Oijen 2004; Van der Krogt et al. 2007). For example, Cook (1994, 46) states that some cooperatives have a '... conservative, defensive, operation-oriented corporate culture, one that is

almost anti-offensive’, while others ‘... have been aggressively innovative and expansion oriented.’ One of the reasons for the differences in strategies may be the relationship between the Board of Directors and the Management.

Corporate governance is a recurrent issue in the literature on cooperatives (Anderson 1994; Cornforth 2004; Fulton and Giannakas 2007). Researchers have not only constructed classifications of board models but also discussed how the different models affect the cooperatives’ operations and performance. Researchers have especially noted that cooperatives change their decision model as they experience difficulties due to changing market conditions (Hendrikse 2007).

In a survey among 33 of the largest agricultural cooperatives in the Netherlands, Bijman et al. (2013) identified three main categories of board models. The Traditional model implies that the members decide, although via the Board of Directors. “The main characteristic of the Management Model is that the professional managers make up the Board of Directors of the cooperative” (Bijman et al. 2014, p. 655). In the Corporation model, the management has full control of the cooperatives’ business activities, because it presupposes that “cooperatives ... have a legal separation between the cooperative association and the cooperative firm, where the association is the full owner of the firm.” (Bijman et al. 2014, p. 211).

Bijman et al. (2013) found that fifteen cooperatives adopt the Traditional model, running the business activities within the cooperative society with a Board of Directors as the decision-making body, while ten cooperatives are governed by the Management model. They have their operations within a fully owned subsidiary, in which the Board of Directors and the Management of the cooperative enterprise constitute one decision making body. The remaining eight cooperatives are characterized as having adopted the Corporation model, in which the chief executive officer controls the cooperative firm, while the Board of Directors heads the cooperative society of members. Thus, the cooperative business firm is formally separated from the cooperative society.

### ***Switches of board models***

The Traditional model is the one that cooperatives have used since the inception of the cooperative business form. It is still by far the most widespread one among cooperatives around the globe (Chaddad and Iliopoulos 2013). The farmer domination and thus the production orientation that is immanent in the

Traditional model is instrumental for the production of large volumes of high-quality agricultural products.

However, many cooperatives with a Traditional board structure have during recent years adopted other models. Such shifts make research about cooperative board models interesting. It has been claimed that cooperatives shift their board model because increasingly competitive markets require new strategic action, whereby another type of leadership is needed. The new strategies contain a multitude of elements (Trechter 1996; Van Bekkum 2000; Kyriakopoulos et al. 2004; Cechin et al. 2013). Production must be more differentiated due to the increasing market demand for variety, convenience and innovations; the production orientation of traditional cooperatives must be substituted by market orientation; there is a need for heavy investments that cannot be carried by the members of traditional cooperatives; and in competitive markets there is a need for rapid and thus centralized decision making (LeVay 1983; Bager 1996; van Bekkum 2000).

In order to solve these problems many traditional cooperatives have felt the need to strengthen the Management's autonomy, to establish a legal separation between cooperative society and the business firm, and to professionalize the supervisory bodies. This has meant a re-orientation towards more customer focus, diversification and innovation, all of which I were accomplished through changes in the decision-making structure.

In cases when the professional Management gets more power, the members may fear agency problems as a consequence of the information asymmetry between the Board and the Management. The result may be a loss of member commitment (Hogeland 2006; Österberg and Nilsson 2009; Nilsson et al. 2012). For example, the largest vegetable marketing cooperative in the Netherlands lost many members when Management power was strengthened after a strategic shift from serving producers to serving both customer and producers (Bijman and Hendrikse 2003).

The analysis in the next section shows that a cooperative's choice of board model has an impact on performance. It also entails that the differences between cooperatives and investor-owned firms may at least partly be due to a difference in the allocation of power (Bond 2009), next to the identity of the owners of the enterprise. At least some of the variation in the behavior of cooperatives and investor-owned firms is due to the firms' internal governance.

### 3 Model

This section presents a non-cooperative investment proposal game between the Board and the Management in an agricultural cooperative. The Board advocates strategies, which are in the long-term interest of members. Assume that the Board must choose between proposing an investment project, M, or doing nothing, N. The Board receives payoff U when such a policy is adopted. The value U represents the investment project serving member interests, such as decisions regarding prices paid to the members or services rendered to members, whereby the directors experience more appreciation by the membership and a higher chance of being reelected.

Similarly, the Management is assumed to propose strategies, which are geared towards developing the downstream market(s) even though these investments go beyond what is in the interests of the members. Assume that the Management chooses between proposing an investment project, E, or doing nothing, N. The Management receives payoff D when such a policy is adopted. The value D reflects the focus on downstream activities, like investments in foreign operations and the processing of non-member products. The managers may want to promote their reputation in the market for managers, or they may want to expand the business firm in order to strengthen their power and get a higher salary.

If the Board chooses M and the Management N, then the Board receives payoff U, while the Management receives nothing. If the Management decides E and the Board does nothing, then the former receives D and the latter nothing. Each player loses an amount L when they choose M and E, i.e., L is the loss associated with having a duplication of proposals. Finally, if both players choose N, then each player earns nothing. The players decide simultaneously. Table 1 summarizes the game.

Board	Management	
	E (proposing investment)	N (doing nothing)
M (proposing investment)	(-L,-L)	(U,0)
N (doing nothing)	(0,D)	(0,0)

Table 1: Coordination game between the Board and the Management

The payoff (-L,-L) has different interpretations. One is that none of the proposals are implemented and that there are costs for each party due to duplication, e.g., the time dedicated to dealing with the duplication. A lack of proper response to market opportunities and threats may lead to a loss of competitiveness. Another interpretation is that both proposals are implemented, but that the costs of having two proposals are higher for each player than the benefits. The interpretation of L in this case is the net cost. If the payoff for each player is positive when they both formulate an investment proposal, then Table 1 does not reflect a coordination game anymore, i.e., there is only one equilibrium. We focus on the case where the interaction between the Board and the Management is characterized as a coordination game.

The mass-action interpretation of this game highlights the mixed strategy Nash equilibrium. The probability that an outcome occurs is interpreted as the proportion or fraction that this type of occurrence occupies in the population of cooperatives. The traditional model of board structure is associated with the Board choosing M and the Management choosing N, i.e., the Board's choice is implemented by the Management. The Management model is the mirror image of the traditional model. The Management is in charge of both formulating proposals and making decisions.

The mixed strategy equilibrium consists of the Board of Directors choosing M with probability  $D/(L+D)$  and the Management choosing E with probability  $U/(L+U)$ . These probabilities are determined by each player choosing the frequency of proposing an investment in order to maximize the expected payoff. We associate this mixed strategy equilibrium with the Corporation model. The decision-making process in a cooperative with the Corporation model may run smoothly in the sense that neither conflict nor inertia occurs. Sometimes a cooperative with the Corporation model behaves like the Traditional model, i.e., the proposal of the Board is implemented when the

Board chooses M and the Management chooses N, and sometimes it behaves according to the Management model, i.e., the proposal of the Management is adopted when the Management chooses E and the Board chooses N. However, problems regarding decision rights will also occur endogenously in our model. The duplication of proposals occurs when the Board as well as the Management formulate a proposal. Our model highlights delay, or inertia, as another problem, which is represented by the situation when both parties choose to do nothing. Duplication, or conflict, occurs with probability  $DU/(L+D)(L+U)$ , while delay, or inertia, occurs with probability  $LL/(L+D)(L+U)$ . Hendrikse (1998) highlights type I and type II errors as alternative problems.

There are a number of results regarding performance. A first observation is that the total surplus in a cooperative with the traditional board model is U, while the cooperative with the Management model generates a surplus D. The efficient choice of board model depends therefore on the value of U versus D. The Traditional model is efficient in markets where U is larger than D, while the Management model is efficient when D is larger than U. Second, the Corporation model is never efficient due to the occurrence of conflict and inertia. These payoffs in the various board models reflect a V-shaped pattern when the relationship between board model and performance is presented in a graph. On the horizontal axis is the amount of power allocated to the Management in a specific board model, and on the vertical axis is the total surplus. If the Management has no (some, all) power, i.e., the Traditional (Corporation, Management) model, then the surplus is U (0, D).

The calculation of the population composition in terms of the equilibrium mixed strategy is based on the value of U, D, and L. This requires that these values are known. However, they are often hard to measure. An empirical strategy to test the validity of our approach is to use population compositions to infer these values. Bijman et al. (2013) provide an example, reporting the population composition. This is possible because the equilibrium fractions in a certain population are expressions of U, D, and L and can therefore be rearranged in such a way that the value of U, D and L are expressions in terms of the observed fractions of each population type. Following this approach allows the researcher to rank the U (D, L) across populations and explain the ranking based on a detailed description of the population.

## 4 Discussion

According to the preceding section, the board structure variety in the agricultural cooperative business sector is an equilibrium phenomenon. There are, however, differences concerning the performance of the three models. *The Traditional Model* performs best for the members in cases when there are good investment opportunities in upstream activities. Thus, the cooperative provides financial means to the farmer-members who can then make profitable investments in their farming operations. *The Managerial Model* best benefits the members when the cooperative business firm has promising opportunities in downstream markets, operating on market for value-added products. In contrast, *The Corporation model* is not good for the members irrespective of whether there are good investment opportunities in upstream or downstream markets. When a cooperative's Board of Directors delegates all decision rights to the Management, the professional leadership will not make strategic decisions that are in the long-term interest of the membership.

As seen below, these observations are in line with several previous studies, many of which present how cooperatives have switched from one board model to another one. The studies explain how the relationship functions between cooperatives' board structures and the strategies that are demanded by market conditions. This research consists mainly of case studies, conducted among agricultural cooperatives in Denmark, Sweden, the Netherlands, Ireland, New Zealand, USA, Canada and other countries, and they have focused on cooperatives in a wide range of agricultural industries.

Some studies report that the Traditional model has been retained and strengthened. The cooperatives have responded to intensified competition by focusing even more on production orientation and a low-cost strategy, which is to say that the Traditional Board model is successful (Nilsson and Petersen, 2001; Nilsson and Ohlsson 2007; Nilsson and Rydberg 2015).

Other studies present cases where the Traditional model has been substituted by a Managerial board model. Intensified competition has induced cooperatives to develop value-added strategies to be orchestrated jointly by the Management and the Board (Nilsson and Gunnarsson 2000; Bijman and Hendrikse 2004; Nilsson et al 2009; Ollila et al. 2014; Hakelius and Nilsson 2020).

In other cases, cooperatives have kept their Traditional board model even though they have adopted value-added strategies. Due to poor monitoring and

capital constraints, the result has been a Corporation board model or a demutualization (Lamprinakos and Fulton 2011, Nilsson and Lind 2015).

Another situation is that cooperatives have kept to their traditional business form and traditional board model simultaneously, investing in downstream activities as a response to increasingly turbulent markets; nevertheless, the members have been unable and unwilling to finance the expanding operations and govern the cooperative. The result of a poor alignment between market conditions and traditional board model may be failure and demutualization (Anderson and Henehan 2001; Fulton and Hueth 2009; Lamprinakos and Fulton 2011). After a cooperative has faced failure and been demutualized, the business operations may continue and become profitable under the new ownership as well as appreciated by the farmers (Nilsson et al. 2014).

Even though the conclusions of our analysis are in line with previous studies, there may, however, be a divergence between the market structures and the board model of a cooperative because markets change incrementally, whereby the members do not recognize them. Moreover, farmers might be so accustomed to the traditional cooperative model that they reject organizational changes (Nilsson et al. 2012). Hence, cooperatives may use another board model apart from the one that best fits their market conditions, although often with poorer than necessary results.

Thus, there is empirical evidence that supports the preceding section's hypotheses about links between cooperatives' board models and market conditions. This evidence does, however, suffer from the fact that the case studies concern many countries, industries and market conditions, which is to say that the evidence is scattered, and there is often a lack of depth. It seems as if the authors have most often not had access to data from within the cooperatives' decision-making bodies. The decision-makers' contemplations in connection with the choice of board model is still a black box. Thus, to test the arguments, which are put forward in the present study, there is a need for more empirical studies, preferably about the behavioral and social processes in the context of cooperative decision-making.

Except for such behavioral and socio-psychological studies, there is a need for research using other approaches that allow for different board models, such as the contingency approach of Management (Kast and Rosenzweig 1979), population ecology (Hannan and Freeman 1977), and the system of attributes (Milgrom and Roberts 1990). Further research may want to determine the similarities and differences between these approaches in terms of population composition.

The correspondence between the three Board models that are analyzed in this paper, and the case studies referenced above is, however, incomplete. This observation calls for a more elaborated classification of cooperative internal governance models, to be developed in future research on the basis of existing classifications (Chaddad and Cook 2004; Chaddad and Cook 2013; Grashuis and Cook 2017).

## 5 Conclusions

Two questions were deducted from the aim of the study that was stated in Section 1. The conclusions of the study are the answers to these questions: (1) Various board models co-exist among cooperatives, because cooperatives operate under different market conditions – some cooperatives have better opportunities in upstream markets and others in downstream markets. (2) A focus on upstream and downstream markets calls for a Traditional Board model or a Management Board model, respectively, while a Corporation Board model may be problematic when it comes to satisfying member interests.

*The Traditional Board model* is well-suited when a cooperative works with collecting a large volume of high-quality agricultural products and processing these into a form where they can be sold on a large market. Such a strategy of low-costs through economies of scale means that the need for financial capital is limited, so the members can afford the investments. This strategy also means that the members are able to control it, and there are good opportunities for involvement and cohesion in the membership.

Alternatively, a cooperative could choose a differentiation strategy, which means that members – perhaps together with some external capital – are able to invest in costly processing and marketing assets. Such a strategy requires a professional management, i.e., a *Management Board model* is appropriate.

The *Corporation Board model* implies that the Board of Directors has delegated the power to a professional management, which is thus not under strict control by the board. The rationale behind this model is that the cooperative must follow a differentiation strategy due to intense market competition. This board model is, however, doubtful, because the Management has the possibility to promote its own interests rather than the interests of the farmer-members. The members are likely to feel less involved and refrain from both investing in the cooperative and taking part in the governance.

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