On The Future of Co-operatives: Talking Stock, Looking Ahead

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ON THE FUTURE OF CO-OPERATIVES: TAKING STOCK, LOOKING AHEAD

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Abstract

Two extensions are formulated of the analysis of the allocation of decision rights in Hendrikse and Veerman (2001). First, the incomplete contracts in their article can be viewed as simple long-term contracts, i.e. it is not allowed to make the allocation of authority contingent on the circumstances. Contingent long-term contracts are now considered. Second, another aspect of decision rights is the frequency of meetings between the owners and managers of enterprises. This aspect will be addressed from a long-term contract perspective as well as a loss aversion perspective.

Key words: Contingent control rights, frequency of board meetings.

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1 Introduction

Co-operatives are special. They have two faces, one face is that of a union of members, the other looks like an enterprise. Some people see them as a poor man's answer to the fury of free market forces. Others, the true cooperatists, consider them as a most effective answer to specific market conditions and an efficient form of organization with respect to different interests of many stakeholders.

The history of co-operatives is impressive. From the well-known, early Rochdale pioneers towards our time, a great number of co-operatives or forms of co-operatives can be perceived.[1] Interesting is though the fact that co-operatives have changed in a specific way. From small ones in the early days, they grew bigger in response to changing conditions in the market and in society. But they changed also in character. Especially in agriculture, wherein co-operatives are dominant. Patisson (2000) claims that one third of world food production passes through co-operatives. This change of character manifests itself in the governance structure and in its public appearance, i.e. members do have a less influential position in decision-making and co-operatives nowadays behave sometimes like ordinary enterprises. The difference between, for instance, a stock listed company like Numico and a co-operative like Friesland Dairy Foods are fading away. Their market behaviour is the same, the only difference for the outside observer is the two times yearly show of member gatherings with the management and the board of directors. However, there are less visible differences in terms of objective (high raw product prices, large volume, member services, etc.).

The efficiency of the marketing co-operative versus the conventional firm is analyzed in Hendrikse and Veerman (2001) from a governance perspective. The marketing co-operative (conventional firm) is efficient when the investments in relationship specific assets at the upstream (downstream) stage are more important. Hansmann (1996) characterizes a governance structure by decision rights and income rights (Hansmann, 1996). Decision rights concern all rights regarding the deployment and use of assets, while income rights are rights to receive the benefits and obligations to pay the costs that are associated with the use of an asset. This paper addresses some aspects of the restructuring of agricultural co-operatives in terms of decision rights.

The allocation of ownership in Hendrikse and Veerman can be viewed as a simple long-term contract. It is simple because it is non-contingent, i.e. it is not allowed to make the allocation of authority contingent on the circumstances / results. However, richer long-term contracts allow for this possibility. This paper considers contingent long-term contracts, where contingent means that the identity of the decision maker depends on the circumstances. Another aspect of decision rights is the frequency of meetings between the owners and managers of enterprises. This aspect will be addressed from a long-term contract perspective as well as loss aversion perspective.

This article regarding the governance and change of co-operatives is organized as follows. Section 2 takes stock of the impact of co-operatives. Sections 3 and 4 look ahead. Section 3 considers contingent long-term contracts, while section 4 addresses the impact of loss aversion. Finally, section 5 concludes.

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[1] The history of co-operatives does not start with Rochdale. Historians go back to ancient times (McBride, 1986).

2 Taking Stock

Co-operatives, especially in agriculture have had, during the past century, in their different forms an enormous influence in supporting the interests of farmers and in serving the public. They have been a success story. For example, in the dairy sector in the Netherlands nearly 85% of all processed milk is in the domain of a small number of co-operatives. Traditionally there are a number of reasons why co-operatives have been created; spreading of different kinds of risks, increasing market power, economics of scale and scope, and so on. All these reasons are still of interest, but during the last twenty years conditions in the market and in society have changed drastically. The process of increasing scale was realized by the merging of numerous co-operatives. Activities were directed to one and the same goal; scaling up reduces costs of processing, overheads, research, and it increases market power. The description of this process is as clear as simple as it has been effective. The European Agricultural Policy shaped the conditions wherein the co-operatives could along side with their members, increase production and also effectively implement the strategy of low cost production. Because market conditions were clear, safe and durable, investments were at low risks and politicians could be influenced to prolonge conditions as they were. So the outside world was well ordered and quite stable from the sixties towards the mid eighties. The inside world of co-operatives was relatively stable too. Strategy was clear, member's interests homogeneous and evident. Discussions concentrated on questions of realized revenues for he members in view of those of the private enterprises and colleague co-operatives.

The internal drive was straightforward; be better than the others and your members will be silent although never satisfied. Now this clear and cosy world has changed. From the mid eighties, it became more and more clear that the CAP had to be changed in view of budgetary problems, market distortion, and international trade hindrance. The basic problem for an industry, how to organise and manage the profitable sale of the products to clients, became a reality for the whole agricultural sector. Government market interventions in order to stabilise prices at the politically desired level were reduced, intervention prices lowered (cereals), productions quota proclaimed (dairy), direct income support introduced, and other market regulations drastically changed. The focus of the market and price policy of the CAP was changed towards more structural means to develop and support agriculture, in specific regions, and for specific environmental purposes.

It is clear that although these measures were directed to solve the political problems of the CAP, co-operatives found their world changing fundamentally. We will in short sum up the most important changes and analyse what this did to the co-operatives and their strategic answers. First of all the reaction of co-operatives were different in the various sectors of agriculture. Production quota in sugar and milk productions generate a different strategic turn than in cereals and animal production. Scaling down production capacity and optimisation of processing was the strategic answer to the first, an increased focus on a low cost strategy by means of increasing scale and merger the answer to the second. But in all this fury of adaptation to changing conditions, the focus was still dominant on production and processing, and not so much, at least as intensive as necessary, on the demand side of the market. Numerous publications stipulated the absolute need for a change of focus from supply orientation towards demand orientation. Many politicians suddenly having seen the light of the new era, pleaded for radical changes. Managers tried to formulate new strategic options. So nearly everybody realised what was going on, even the agricultural producers. But this need to change is very difficult to implement, especially for co-operatives, because members interests being dominant, it is needed to convince members first in order to be able to do what must be done. But how to convince a large number of critical members that is accustomed to a situation of relatively stable conditions of the need to change, while these changes do both affect their own situation directly as well as that of the co-operative? How to choose between the interests of the co-operative in the long run and of the interests of their own firm in the short run?

Secondly, a number of other developments were generated as a consequence of this change of orientations. The process of increasing scale that has been effective for a period after the war, was intensified and its speed increased strongly. As a consequence, the relative homogeneity that had been characteristic of the agricultural sector, broke down. The process of winners and losers that had been at work for decades and accepted as a fact of life, now speeded up in a very aggressive way. Because in a demand oriented market there is only limited place, it is essential to be a part of it. Globalisation and the results of changing protection of agriculture enhanced this process enormously. As a consequence, differences between farmers grew bigger, furthermore the demographic development in agriculture is of importance. Since in Western Europe globally speaking more than half of its professionals in agriculture are above fifty years of age, and less than half of them has a successor. It is clear that where the horizon for elderly people is quite different from that of the younger ones, strategic interests are very different. So co-operatives being guided by members are facing increasing internal problems about the choice of strategic options.

Thirdly, market orientation confronted the sector with the needs and demands of the modern consumer. In short, it can be stated that the CAP had disconnected the producer and its co-operative from the consumer. Producers concentrated on production of standard goods of a medium but acceptable quality at the lowest possible costs, were confronted with decreasing demand due to market saturation and the demand for higher quality. But how can this be met? Theoretically the price mechanism will regulate markets and by means of price signals information is forwarded from the consumer to the producer. As shown, the CAP frustrated this process, but even in more or less liberal markets like potatoes, fruit and vegetables, price changes did have limited effects (Van Den Bosch and Veerman 1980, 1983). There are two reasons for this inadequacy of this price mechanism perspective. First, the theoretical conditions are not perfectly realised. Political intervention means that there are two markets, and the rational producers adapt to both of these. Good adaptation to the political market means bad adaptation to the commercial market, and vice versa. Second and even more interesting, since the dramatic changes in what we call nowadays the food chain, prices do play a modest role since other aspects of a product are becoming more dominant. Quality of the product, reliability of delivery, safety of foods, lowering costs of logistics, food integrity, and sustainability of production are the most relevant issues in the mindset of the modern consumer and the retail business. So it is necessary as a recent report in the UK stated clearly (Farming and Food, 2002) to reconnect the farmer and the consumer. But there is more. In view of the changing demands of consumers, especially the increasing demand for convenience due to rise in general welfare as well as changing social conditions, the value of the product of the farmer and by that his share of the pie has decreased towards for some essential products like bread to 5% of the consumer price. Alongside the food chain, the added value increases stronger the closer one is to the consumer. The value chain is therefore unfavourable for farmers and also because of a (too) late shift in strategic focus for the co-operatives.

Fourthly, it can be perceived as a result of more general changes in society and in the mind of people that intangible elements of social behaviour like solidarity, sharing of collective ideals, acceptance of responsibility for collective goals, and a preparedness to have a long view, undermine the essential element of the co-operative namely: trust. In a sense a co-operative is well-organised trust.[2] If the co-operatives expand and become more complex, then the heterogeneity increases. This is the threat to trust, because conflicting interests are introduced in the membership.[3]

Lastly, it is of importance to note that changing preferences and opinions of people in our times with respect to agriculture and the ways this sector is handling animals, the environment, and our natural resources, forces farmers and their co-operatives to focus not only on direct market-driven changes as discussed above, but also on indirect goals that have to do with good agricultural practice, the production of non-marketable goods and services. In short, in trying to meet these kind of demands one needs to have a virtuous and not only a valid enterprise.

In conclusion it can be stated that the challenges for co-operatives are fundamental and numerous. Co-operatives have given an essential contribution to their members, but are they capable to do so in the future, are they flexible and professional enough, will members give way to the managers, will members support their co-operatives financially, and so on. Some of these questions will be addressed with the help of some theory in the next sections.

3 Contingent decision rights

The rules embedding transactions can be formal as well as informal. The formal rules (section 3.1) are represented by the (allocation of) decision rights of an incomplete contract, while the informal rules (section 3.2) can be modelled by an implicit / relational contract. The performance of formal organizational structures and institutions depends importantly on the informal relationships that these structures and institutions facilitate, where the informal rules serve to complete the incomplete contract. The formal rights of an incomplete contract determine to a certain extent the informal agreements which will come into existence, and they are on the other hand affected by them. Implicit / relational contracts, i.e. credible informal agreements, have to be designed in such a way that the reputation of each party is sufficiently important in order to adhere to the informal agreement. It may be optimal to choose an organisation’s formal structure because of its effects on informal relationships within the firm. Communication plays an important role in this respect (section 3.3)

3.1 Formal versus real authority

An important issue in organizing the enterprise is the allocation of control and authority. Standard incomplete contracting indicates that the employee should be the owner of the assets when the relationship specific investments of the employee are most important (Grossman and Hart, 1986). However, this seems to be at odds with a

[2] Recently Fukuyama (1994) pointed out how essential trust is in explaining the welfare development of nations.

[3] Hendrikse and Bijman (2002) have addressed the emergence of grower associations from an increasing heterogeneity perspective.

basic feature of the firm. Crucial to the notion of the firm is the centralization of decision making power, i.e. the employer, not the employee, is the owner of the firm. Similarly, the core of an agricultural co-operative is member control over the infrastructure at the downstream stage. Formal ownership over the downstream assets is the essential feature of a co-operative.

This seems problematic for these governance structures from an efficiency perspective when the relationship specific investments of the employee, or the relationship specific investments at the downstream stage of a co-operative, are most important. However, formal authority does not preclude that this control is delegated to another party, e.g. the employee or a professional management. Control over the operational activities at the downstream stage by a professional management may be efficient when it has superior knowledge regarding final product markets and takes a longer term perspective than the members. This way out of the problem requires the creation of an additional degree of freedom in the design of governance structure, i.e. a distinction is made between formal and informal authority (Baker, e.a., 1999). Formal authority resides at the top, whereas informal authority can be either centralized or decentralized. So, the efficiency of a relationship may be enhanced by giving up some control, i.e. giving real authority away, even though the formal control stays at the top (Aghion and Tirole, 1997).

The distinction between formal and real authority creates an additional governance structure: informal authority / contingent control. Informal authority entails that the members delegate their formal rights to the professional management as long as everything works well, while these rights go back to the members during bad times. Despite their large financial stake, farmers should therefore take some distance from the affairs / policy of the professional management as long as everything goes well. They should limit themselves to the role of investor. Frequent, one-sided directives from the members, including financial decisions, frustrate the blossoming of the downstream operational activities. Contingent control is characterized by decentralized operational activities and financial decisions. Members should only use their formal power to direct co-operative decisions during structurally bad times.

Notice that contingent control may be superior to (unconditional or non-contingent) delegation as well as centralization. It is superior to delegation because the professional management is restrained in proposing projects which are bad for the members, i.e. they may have superior final product market knowledge, but they need to be employed by the co-operative enterprise in order to have access to the co-operative structure to bring this knowledge to value (Rajan and Zingales, 1998). It is superior to centralization because the innovation incentives for the downstream professional management are stronger.

A co-operative may also be superior to a stock listed enterprise due to the continuous exchange of information between members, which enables them to evaluate the decisions of the professional management better than the many small shareholders of stock listed companies. And not only this, the exchange of information from the professional management to the members and vice versa can create a strong mechanism of effective and quick adaptation to changing market conditions.

3.2 Trust

Again the allocation of authority in organisations is analyzed when there is a divergence of interests between the various stakeholders, but now the formal as well as the informal allocation of authority is addressed. Knowledge, and its location, is important in analysing the divergence of interests in this setting. The divergence of interests between different parties is problematic from a tacit knowledge perspective. Knowledge which is personal, implicit, or hard to codify and to express in the formality of language, is called tacit knowledge. It is costly to transfer to outside parties and usually resides with a limited number of individuals. The complexity of the environment and rapid technological change places therefore a premium on informal forms of organization in order to bring this tacit knowledge to value, i.e. relational forms of organisation may be most useful in complex environments.[4] Trust plays an important role in these situations.

The informal aspects of organisations have to be considered together with the formal aspects in the design of governance structures (Baker, e.a., 1999, 2002). Ownership of assets determines the identity of party having a reputation for good behavior, and therefore having the possibility of abusing a good reputation, because the party with the decision rights makes a promise to the party without decision rights. For example, if the upstream party owns the asset at the downstream stage, then the downstream party is an internal division rather than an external buyer. The upstream party is interested in receiving high-quality service, and considers providing an incentive for the downstream party to deliver high quality by promising to pay a bonus to the downstream party if the latter produces a sufficiently high quality. Unfortunately, this promise is vulnerable to reneging. The upstream party may simply take the final good without paying the downstream party anything. The implicit contract has therefore to be such that the downstream party trusts the upstream party to pay a bonus for good performance. Similarly, if the downstream party owns the asset, then the downstream party is tempted to renege by taking actions that increase the value of opportunities elsewhere. The implicit contract must be such that the upstream party must trust the downstream party not to hold up the upstream party by threatening to sell the output of the asset elsewhere.

The choice of governance structure is therefore determined by a tradeoff. Downstream ownership offers the downstream party bargaining power. This increased downstream bargaining power decreases the upstream party’s temptation to renege by lowering the payment for the output delivered by the downstream party. However, downstream ownership also encourages the downstream party to consider the interests of other parties, i.e. improve the bargaining position by inefficient actions, and hence may create a temptation for the downstream party to renege. Non-integration is optimal when the first consideration is important, while dominance of the second consideration favors integration.

Vertical integration is according to this perspective an efficient response to widely varying supply prices. A key difference between relational outsourcing versus relational internal procurement is that the good’s value in its alternative use affects the reneging decision under relational outsourcing, but not under relational internal

[4] Notice that the contingency approach (Burns and Stalker 1961, Lawrence and Lorsch 1967, Kast and Rosenzweig 1979, and many others) implies exactly that a complex and dynamic environment favors organic ways of organizing.

procurement. Extreme realizations of the supply price undermine the stability of the implicit contract when the governance structure relational outsourcing prevails, whereas the reneging temptation is independent of the supply price when the governance structure relational internal procurement is chosen. Vertical integration reduces therefore the temptation to renege when there is substantial uncertainty regarding the supply price.

The most important insight of this section is that the stability of an implicit contract (informal rules) depends on the allocation of decision rights (formal rights). The allocation of formal rights determines not only the identity of the party developing a reputation, but also the costs and benefits of adhering to an informal contract. Hendrikse and Veerman (2001) and Hendrikse and Bijman (2002) have stressed the importance of specific investments in allocating decision rights. This section has added that this allocation determines to a certain extent the emergence of informal relationships. The allocation of (formal) decision rights to the party doing the specific investments solves his fear for hold-up in a considerable way, but it creates also an informal hold-up problem by encouraging to (partly) renege on promises that have been made to the other party.

3.3 Communication

'Professional management' in co-operatives is chosen based on their expertise regarding downstream operational activities. They possess the knowledge to develop the downstream agricultural markets. The importance of this knowledge may require that the decision rights regarding the downstream operational activities is delegated to them in order to bring it to value. However, changing one attribute of the enterprise will have an impact on the other attributes (Hendrikse and Veerman, 1997). The choice of each of the other attributes has to be aligned with this choice, given the prominence of this attribute. One of the other attributes is the communication between the members and the professional management.

An important task of the professional management is communicating with the members, because they are still the owners of the co-operative. Having members with their farming background and formal authority, and professional management with their final product market orientation and real control, in a 'new' co-operative provides opportunities as well as dangers. Lazear (1999, p C15) observes: 'Three factors determine the gains from putting together diverse teams. The gains from diversity are greatest when groups have information sets that are disjoint, that are relevant to one another, and that can be learned by the other group at low costs.' The first two factors seem to be satisfied in co-operatives. However, the third factor is frequently problematic, because the 'finite province of meaning' (Arbnor and Bjerke, 1997) of the professional management may differ considerably from the finite provinces of meaning of the members. Figure 1 presents the different provinces of meaning of the various stakeholders of a co-operative, where the prominence of the farmers / members in indicated in bold.

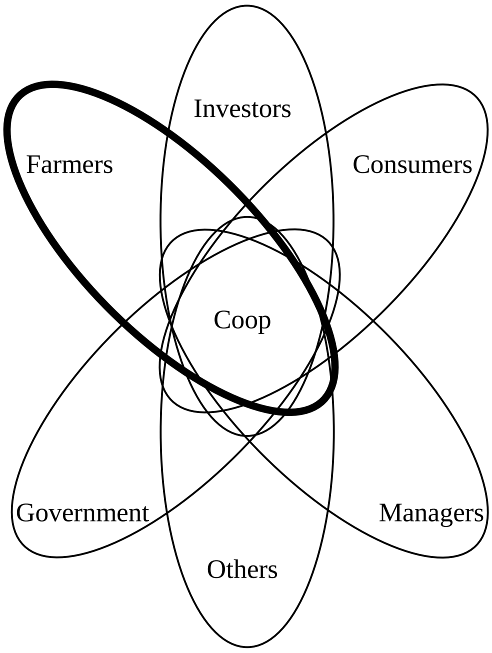

Figure 1: Intersecting provinces of meaning in an agricultural co-operative

One way to facilitate the communication between the members and the professional management is to appoint a co-operative board consisting of representative members. It has the important role of taking care of the communication between the members and the professional management. This board has on the one hand to explain the policy decisions of the professional management to the members, and on the other hand to inform the professional management of the considerations of the members. It has to strengthen the common ground (Devlin, 2001). It serves the role of an intermediary, which is important in establishing and maintaining trust. Top-co-operatives have often problems with this because their members are co-operatives, which creates too much distance with the farmers. Communication is an essential activity in co-operatives, especially because members interests are more and more diverse (section 2). In addition to this, a co-operative board can be formed as a combination of non-executive (experienced) members and members representing the farmers. This secures professional supervision of the management as well as members' dominance on important decisions.

4 Frequency of board meetings

Changes in investment policy, or the change of governance structure, is often slow. It is usually delayed, or does not occur at all. This section focuses on the effect of the frequency of evaluations in a governance structure on the choice of investment projects. Repeated game incentives are highlighted in subsection 4.1, while loss aversion is the focus of analysis in subsection 4.2.

4.1 Repeated game incentives

The role of implicit / relational contracts is to utilize the parties' detailed knowledge of their situation to adapt to new contingencies as they arise. This knowledge is repeatedly brought to value by the concern for maintaining a reputation for honoring informal agreements. The Folk-theorem (Fudenberg and Maskin, 1986) implies that the stability of an informal agreement depends on the:

- costs and benefits of finishing a relationship;
- history of the relationship;
- observability of decisions.

If the benefit of defection is larger than the costs, then it is predicted that the relational contract will fall apart. Second, a relationship is hard to restore once it is damaged, i.e. recurring relationships are path dependent. The emergence of relational forms of organisation, and which ones flourish, depend therefore on the history of prior relationships. Finally, the observability of decisions is important for the stability of long-term relationships. Cheating on implicit agreements becomes more attractive when the observability of decisions decreases. This argues for frequent meetings of the general assembly in co-operatives in order to discover the professional management's eventual deceitful or incompetent behavior in an early stage.

4.2 Loss aversion

One of the core building blocks of economic theory is expected utility theory (regarding consumer behavior). An implicit assumption in expected utility theory is that a reference point or frame does not play a role in decision making. No distinction is made between profits and losses. An increase in the loss by 10 euros is treated in the same way as a decrease in profits by 10 euros. However, a large amount of experimental evidence indicates that losses count twice as much as gains in terms of valuation (Tversky and Kahneman, 1992). Reference points, and therefore the difference between gains and losses, plays a prominent role in this approach. (Cumulative prospect theory focuses on changes in utility, whereas expected utility theory is concerned with utility levels.) The utility function shows a kink at the reference point, i.e. a loss is not perceived as exactly the opposite of a gain. *Loss aversion* entails that a gain of one euro is not sufficient to compensate a loss of one euro. Two euros are needed to compensate a loss of one euro. An example of the prominence of loss aversion in co-operatives is that decision rights are not considered that important during times when the co-operative is doing well, whereas they are highlighted when things go bad.

Loss aversion has implications for the design of governance structure in terms of the frequency of evaluations.[5] The co-operative may benefit from fewer meetings of the General Assembly. Loss aversion is posed as an explanation. The idea is that frequent evaluations are unattractive for farmers with loss aversion, because the value of their enterprise may fluctuate too much. Suppose that the co-operative is on average attractive, i.e. there is on average a gain. However, sometimes an upswing occurs, sometimes a downswing. The problem is that a loss weighs much more than a gain in the valuation function of a farmer with loss aversion. Low yield projects are chosen instead of high yield projects in order to prevent a loss during the life span of the project. The same holds for an employee having to report frequently to his boss. Even tough the activities of the employee are high yield in the long run, he still faces

[5] Other implications can be formulated regarding the change in the membership of the co-operative (Fershtman, 1996), and the speed of organizational change (Hendrikse, 2000).

the risk to have to take a loss once in a while. This is unattractive when you have to report frequently. The implication is that too much emphasis will be put on preventing losses, which results in weaker performance.

The following example illustrates the line of thought (Benartzi and Thaler, 1995). Suppose there is a piece-wise linear utility function, where the utility is U(x) = x when x is positive, i.e. represents gains, and U(x) = 2.5x when x is negative, i.e. represents losses. The loss of one euro is therefore 2.5 times as high as the gain of one euro. This specification implies that a proposal will be rejected that consists of gaining 200 euros with probability 0.5 and loosing 100 euros with probability 0.5, because the expected utility is 0.5*1*200 + 0.5*2.5*(-100) = -25. However, if this person is confronted with this proposal repeatedly and evaluates it only once every two periods, then this proposal would be accepted. The probability distribution of the outcomes over two periods is 400 (100, -200) with probability 0.25 (0.5, 0.25). The expected utility is therefore 0.25*1*400 + 0.5*1*100 + 0.25*2.5*(-200) = 25.

These considerations have consequences for the design of an efficient governance structure. A farmer characterized by the above utility function and being a member of a co-operative with frequent meetings of the General Assembly, will not consider the co-operative enterprise attractive. The reason is that gains fluctuate almost always and the farmer values a decrease 2.5 times as high as an increase. The governance implication is that farmers should not too often ask the professional management to render account. Professional managers choose more risky, higher yield investment projects when they have to report less. Notice that this implication is at odds with the implication in section 3.2. The stability of long-term agreements increases when the frequency of evaluations increases. This reduces the attractiveness of cheating on the informal agreement. A loss aversion perspective argues for decreasing the number of evaluations in order to decrease the impact of (probabilistic) losses by averaging them with (probabilistic) gains.

A similar recommendation regarding investment policy is that recently started projects should not be allowed to be terminated, i.e. a short-run restraint may be beneficial in the long run. A general insight is that persons with loss aversion frequently choose higher yield activities when the frequency of evaluations decreases. A unique loss becomes less important for the persons involved because the probability is large that this will be compensated before the next evaluation when the evaluation period is sufficiently large.

5 Conclusion

Agricultural co-operatives have to restructure themselves in order to take advantage of the opportunities provided by the new agricultural and horticultural markets. The restructuring of co-operatives may entail transforming the rights and obligations of the members, the need for professional management, changing the frequency of meetings between owners and managers, and creating understanding by and confidence in the relationship with the members. This article has addressed these issues by extending the analysis of Hendrikse and Veerman (2001) by considering contingent decision rights and the frequency of board meetings.

Adjustments in other attributes of the co-operative enterprise have to be made in order to result in co-operatives being at least as attractive as stock listed companies, which is already reality in dairy. Several of these other attributes will concern income rights. Examples are financial instruments and internal transfer price and cost sharing schemes. Co-operatives may even emerge in other sectors, like environmental co-operatives. We hope that this article contributes to the restructuring and design of co-operatives.

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