Marketing Co-operatives: 
An Incomplete Contracting Perspective

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Marketing co-operatives (MCs) are analysed from an incomplete contracting perspective. The requirement of the domination of control by the members of an MC is a threat to the survival of an MC in markets where the level of asset specificity at the processing stage of production is increasing. However, an MC may remain an efficient governance structure when the increasing level of asset specificity is compensated for by a sufficient increase in the extent of product differentiation.

1. Introduction

Several agricultural and horticultural marketing co-operatives (MCs) have recently changed their governance structure. Some MCs are moving in the direction of a conventional, profit maximising firm by issuing some kind of outside equity. Other MCs are relaxing the uniform treatment of the members. Zwanenberg et al. (1992) report about Kerry (1987), Avonmore (1988), Waterford (1988) and Golden Vale (1992) in Ireland. Examples in the Netherlands are Campina Melkunie, with its introduction of participation shares in 1991 (Campina Melkunie, 1991), pharmacist co-operative OPG, with its stock market listing in 1992 (Zwanenberg, 1992), dairy co-operative Friesland Frico Domo, with the introduction of personal financial shares for members in 1994 (NRC Handelsblad, 1994), and the merger of nine fruits and vegetables auctions into The Greenery International in 1995. Cook (1995) reports about the emergence of New Generation Co-operatives in the United States of America. They entail a reorientation of the activities of MCs from a supply to a demand driven perspective.

This article formulates a theory regarding the choice of governance structure in an agricultural chain of production. Some aspects of the viability of an MC will be investigated with the theory of incomplete contracts. This theory is geared towards the institutional aspects of organisations in the form of property rights. A governance structure serves the role of providing investors with the confidence that the benefits of their investments are not captured by other parties. This approach is in line with the

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2. This article is concerned with one-product co-operatives. Many co-operatives in Europe and California are like this. Co-operatives such as those in the Midwest of the United States of America are quite different.

3. Kreps (1990) classifies economic theories according to the assumptions made with respect to the degree of rationality and self-interest orientation. The theory of incomplete contracts is characterised by bounded rationality and an opportunistic orientation.
common view that the members of an MC own and decide upon the assets at the processing stage of production, whereas the shareholders own and decide upon these assets in an investor oriented firm (IOF). The main difference between an MC and an IOF is therefore that the input suppliers have the formal authority regarding investment decisions at the processing stage of production in an MC, whereas the processor has this right in an IOF. The implications of this difference for the efficient choice of governance structure will be analysed. An explanation is formulated for the emergence of the MC at the end of the nineteenth century as well as its current problems.

Section two highlights some aspects of the theory of incomplete contracts and applies it to an agricultural chain of production. Section three formulates the hypotheses of the paper. Section four concludes and indicates topics for future research.

2. The Theory of Incomplete Contracts

The starting point in the theory of incomplete contracts is the observation that the complexity of the real world makes it too costly to describe all relevant contingencies regarding the exchange in a contract. Contracts are therefore necessarily incomplete. The issue of control in a governance structure is framed in terms of the problems associated with the specificity of investments. The incompleteness of contracts causes problems in situations with specific investments, because it prevents the division of the surplus from being specified ex ante. The ex post division of the surplus will depend on the distribution of bargaining power and the ex post bargaining positions. The distribution of bargaining power and the ex post bargaining positions are determined by the choice of governance structure. This will have an effect on the investment decisions.1

The standard way of modelling these ideas is to employ a three stage non-co-operative game. The first stage consists of the choice of governance structure, where each governance structure is associated with a specific distribution of bargaining power. The second stage consists of the (relation-specific) investment decision. The investment decision determines the bargaining positions in the third stage of the game. The third stage consists of the choice between honouring the contract and renegotiating it.

Section 2.1 examines the relationship between the second and the third stage of the game, given a particular choice of governance structure in the first stage. Second 2.2 will use these results in order to analyse the relationship between the first and the second stage of the game. A definition of an MC is formulated which is in line with the incomplete contracting perspective. Section 2.3 presents two hold-up problems in the relationship between the farmer and the processor.

2.1 Hold-up Problem

The incompleteness of contracts entails that not all eventualities can be described ex ante in a contract. Unforeseen contingencies which are not described in the ex ante contract

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1 The incomplete contract literature (Grossman and Hart, 1986 and Hart and Moore, 1990) provides an attempt to model transaction costs economics formally (Williamson, 1985). An advantage of incomplete contract theory over transaction costs theory is that the behavioural assumption of opportunism is maintained in the analysis of all governance structures, whereas this is not the case in transaction costs economics. Another advantage is that it has sharpened the transactions costs argument by suggesting that the crucial difference between governance structures resides in the allocation of residual decision rights.
will give rise to ex post opportunistic behaviour regarding the remaining surplus. An incomplete contract can only consist of clauses which are observable and verifiable by a third party. Clauses which are observable but not verifiable have to be left out of the contract because they are not enforceable. Contractual obligations which are explicitly described in the ex ante contract have to be carried out, and if necessary enforced ex post, e.g. by the court.\footnote{The complete contracting approach does not make the distinction between observable and verifiable contracts. All observable actions are also verifiable. An ex post problem like the hold-up problem and issues of governance have no role in a complete contracting approach because there are no contingencies which are not covered by the contract. The focus is on ex ante problems in the complete contracting approach, whereas ex post problems are at centre stage in an incomplete contracting setting.}

The incompleteness of contracts causes problems when the parties involved in the exchange make specific, irreversible investments.\footnote{These investments have a significant higher value within the relationship than in alternative uses.} This puts the investor in a weak bargaining position regarding the division of the ex post surplus. However, the investor anticipates that the other party may take advantage of the incompleteness by claiming a larger share of the ex post surplus than initially agreed upon. This fear for ex post opportunistic behaviour prevents the investor from choosing the project with the highest surplus. This is the (inefficient) hold-up problem (Klein \textit{et al.}, 1978).

A numerical example may illustrate the hold-up problem. Suppose a farmer considers buying new equipment at costs 40. The level of sunk costs (or the irreversible component of this investment, or the level of asset specificity) is equal to $k_f$. A processor is willing to pay 50 for the raw material produced by the farmer. The efficient decision of the farmer is therefore to invest, because there is a surplus of $50 - 40 = 10$ to be realised.

The farmer and the processor sign a contract before investment takes place. A contract may specify that each party receives half of the surplus, i.e. the contract specifies a price 45. If the processor honours (H) this contract ex post, then each party earns 5. The problem with this contract is that situations may arise for which the contract does not specify anything, e.g. consumer demand is lower than expected. The processor will argue credibly that the quasi-surplus instead of the surplus has to be divided, because the investment in specific assets has weakened the bargaining position of the farmer. This will result ex post in the acceptance of these new terms regarding the exchange. The subgame perfect equilibrium strategy of the processor is therefore to renegotiate the ex ante contract. The processor claims half of the quasi-surplus, where the quasi-surplus is equal to the sum of the surplus and the sunk costs. The quasi-surplus is 10 + $k_f$. The ex post price will therefore be 40 - $k_f$ + $(10 + k_f)/2 = 45 - k_f/2$. The payoff of the farmer is 45 - $k_f/2$ - 40 = 5 - $k_f/2$ and the processor earns 5 + $k_f/2$.

The farmer anticipates that the incompleteness of the contract encourages ex post opportunistic behaviour by the processor. He responds by not accepting the contract when the level of asset specificity is above a certain level, even though it would be efficient. The farmer will not invest when $5 - k_f/2 \leq 0$ i.e. the value of $k_f$ is above 10. The subgame perfect equilibrium strategy of the farmer is N, i.e. the farmer will not invest in specific assets, when the sunk costs are higher than 10. Figure 1 presents a situation where $k_f = 20$. Hold-up is represented by the R-branch, whereas the hold-up problem is represented by the N-branch.\footnote{This example is extreme in the sense that there is either the efficient investment decision or no investment at all. Grossman and Hart (1986) have shown that there will be in general underinvestment.}
2.2 Governance Choice and Investment

The above example has been silent about the institutional setting in which the *ex ante* and the *ex post* price are established. It is assumed that the distribution of bargaining power is such that the (quasi-) surplus will be divided 50-50. This division of the surplus is associated with an IOF or market governance in the seminal contributions of Grossman and Hart (1986) and Hart and Moore (1990).¹

The main point of incomplete contract theory is that the distribution of bargaining power depends on the choice of governance structure. Represent the distribution of bargaining power by a number $S$, where $S$ is the share of the (quasi-) surplus received by the farmer. The *ex post* price in the governance structure with bargaining power distribution $S$ is therefore equal to $40 - k_f + (10 + k_p)S$, because the subgame perfect equilibrium strategy of the processor is to renegotiate the *ex ante* contract price after the investment has been made.

The choice of governance structure can be included in Figure 1 by incorporating an additional decision stage at the beginning of the extensive form. A governance choice is associated with the choice of a number $S$. Figure 2 presents the payoffs associated with the choice of governance structure and the choice of investment. The third stage of the game, i.e. the contract execution stage of the game, is summarised by the payoffs which are associated with the subgame perfect equilibrium strategy $R$. If the farmer invests in governance structure $S$, then he earns $40 - k_f + (10 + k_p)S - 40 = (10 + k_p)(S - 1) + 10$.

¹ Hart and Moore (1990) use the co-operative game theoretic solution concept Shapley-value in order to derive that market governance is associated with the 50-50 split of the (quasi-) surplus.
Three governance structures are distinguished: MCo, IOF and P(rocesor) I(ntegration). The IOF is characterised by control of the processor over the assets and inputs at the processing stage of production, whereas the farmers have control over investments at the farm. The value of S of an IOF is equal to 1/2. An MCo is defined by the control of the input suppliers over the assets at the farming as well as the processing stage of production. The farmers are the residual claimants and they have decision authority in an MCo regarding contingencies which are not described in the incomplete contract with the processor. They decide with respect to renegotiating the ex ante agreed upon input price for the processing stage of production. The value of S of an MCo is equal to 1. Finally, PI entails control by the processor over investments at the farming as well as the processing stage of production, i.e. the processor decides with respect to unforeseen contingencies regarding investments at the farming stage of production. The value of S of a PI is equal to 0.1 Table 1 summarises the difference between the three governance structures in terms of ownership in each stage of production.

<table>
<thead>
<tr>
<th>Production Stage</th>
<th>MCo</th>
<th>IOF</th>
<th>PI</th>
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<tr>
<td>Farming</td>
<td>Farmer</td>
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1 The only important aspect of this specification for the subsequent analysis is the ranking of the bargaining power of the farmers in the various governance structures. It is diminishing when there is a switch from the MCo to the IOF and diminishes further when the IOF is replaced by the PI. The exact value of S does not matter, only the ranking is important for our analysis.
Figure 4 depicts a situation where specific investments are considered at both stages of production. It is a straightforward extension of Figure 3. Define the level of asset specificity of the farmer again as $k_f$ and the level of asset specificity at the processor stage of the production as $k_p$. Bargaining positions change from $(0, 0)$ to $(-k_f, -k_p)$ due to the fundamental transformation. Governance structure, i.e. the value of $S$, is again important because it determines the way in which the (quasi-) surplus will be divided ex post. This determines the ex ante investment decision. Only governance structures with $(90^\circ - Y)/90^\circ \leq S \leq (90^\circ - Z)/90^\circ$ are efficient.

The general presumption of this article is that institutions/governance structures matter. Specific results which follow from the above model will now be developed. Comparative statics results are established by the parameters determining the slopes of the two lines separating the efficient from the inefficient governance structures. The slope of the line with angle $Z$ is $k_p/(k_f + V)$ and the slope of the line with angle $Y$ is $(k_p + V)/k_f$, where $V$ is now the size of the joint surplus generated by the two investments.

A first result is that an increase in the value of $V$ will increase the set of efficient governance structures. The larger share of the surplus in the quasi-surplus provides more leeway in the choice of governance structure. Both parties feel secure that their investments will be recouped. An example of an increase in $V$ is more product differentiation.

A second result is that an increase in $k_p$ and/or a decrease in $k_f$ will reduce the attractiveness of an MC as a governance structure. An increase in $k_p$ and/or a decrease in $k_f$ entails that the fear for hold-up regarding specific investments at the processing
of asset specificity at the processing stage of production relative to the extent of asset specificity at the farm will not be accompanied by a switch from an IOF to an MC. A governance structure is predicted in which farmers have less decision power. This seems relevant in the current agricultural and horticultural markets.\(^1\)\(^2\) Nowadays they require specific investments in products with brand names in order to meet the specific demands in the many niches of the market.\(^3\) The attractiveness of an MC decreases with respect to the adoption of efficient investment projects at the processing stage of production because members will also take considerations regarding return on farm investments into account when decisions are made.

It is obvious that the above model is a simplified account of an MC. For example, the model specifies one farmer and one processor. However, every MC includes a number of (different) farmers. This feature can be incorporated without changing our results, because the only important aspect of our characterisation of a governance structure is the ranking of bargaining power of farmers in each governance structure. A second topic which is not addressed is whether the processor accepts the total harvest or a contracted quantity. Normally, an IOF will contract a specific quantity, but in many circumstances an MC will have to accept the total production of a farmer. This is an important distinction. However, a much more detailed specification of the production technology and the demand side of the market is needed to deal with this aspect in a satisfactory way. This is not done in this article in order to keep the analysis as simple as possible. Third, MCs have also been set up in order to do a more effective and efficient processing and marketing than existing IOFs. Hendrikse (1998) addresses some aspects of this issue. Fourth, the costs of the change of a governance structure are not incorporated in the analysis. We have followed in this the standard assumption in the theory of incomplete contracts, i.e. it is assumed that the efficient governance structure is chosen in equilibrium. However, the nature of the modelling approach is such that it does not prevent that this issue is addressed. Many other topics besides these extensions are relevant, e.g. financial contributions of members, legal status, fiscal regime, member involvement, ethical attitudes and (diversification) strategy. Including such issues may of course change some of our conclusions. However, our simple model generated already some interesting relationships.

An important topic for future research is to investigate the possibilities regarding the design of a governance structure which on the one hand maintains the special character of an MC and on the other hand eliminates the inefficiencies associated with this governance structure. Most solutions which are nowadays considered within the MC

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\(^1\) American Crystal Sugar is an example of an IOF which was converted to an MC. Red River Valley Sugar Beet Growers Association acquired the IOF American Crystal Sugar in 1973. Volkin and Bradford (1975) write, “What grower association leaders really feared was the possibility that American Crystal would close one or more of its four plants in Minnesota and North Dakota. This concern was supported by observations that “factory upkeep was not being maintained for most efficient operations” and “steps had to be taken to protect growers’ long-term sugar beet production patterns, which had meant so much to their livelihood”. The change at American Crystal Sugar does not undermine our theory because it provides an example of increasing importance of the first hold-up problem, without making any references to the final product market. If the first hold-up problem becomes more important and the second does not, then our theory predicts that switches from an IOF to an MC are to be expected.

\(^2\) It is claimed that the perishability of crops is nowadays not as much a problem anymore due to technological developments. This observation strengthens our claim, because it suggests that the first hold-up problem has diminished in importance compared to the second hold-up problem.

\(^3\) A brand name is characterised by a very high level of asset specificity.
consist of some differentiation in the financial terms being offered to members. Examples are preference shares and quantum discounts. They take account of the variety between the members. However, this does not solve the second hold-up problem. A governance structure has only one degree of freedom in the above model, i.e. the value of S, in order to solve two hold-up problems. An additional degree of freedom has to be created in order to be able to deal with both problems. The emergence of new governance structures (grower associations, participation companies) or new financial instruments (by exploiting the distinction between income and decision rights) seem to be promising developments in this direction.

References
NRC Handelsblad, Friso Domo (1994). Omzetting tot Vennootschap, September 13, 16.