Restructuring Agricultural Cooperatives

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Coverdesign: © Hendrick Martenszoon Sorgh, De Groentemarkt, 1662, Rijksmuseum, Amsterdam. (Suggested by Kees Goossens)

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Introducing 'Restructuring Agricultural Cooperatives'

George W.J. Hendrikse

The Ph-D defense of 'Essays on Agricultural Cooperatives; Governance Structure in Fruit and Vegetable Markets' by Jos Bijman (2002) brought a number of Cooperative experts together at the Erasmus University Rotterdam. It provided the opportunity to ask the Ph-D committee members, and a few others, to participate in a workshop 'Restructuring Agricultural Cooperatives'. This book is the outgrowth of this event.

Cooperatives are present in many sectors of the economy, like agriculture, banking, retail, insurance, and health care. They are dominant in agriculture. For example, in 1996 the market share of cooperatives in agriculture was 83% in the Netherlands, 79% in Finland and 55% in Italy. The 132.000 cooperatives in the European Union employ 2.3 million people (European Union, 2001). Similarly, over 100 million people are members of 47.000 cooperatives in the USA. Similarly observations are reported by Skurnik and Vihriala (1999, p375): 'In the European Union there are well over 30,000 farmer cooperatives with some 12 million memberships with very considerable market shares in most part of the major agricultural products. The turnover of the top 30 agricultural cooperatives in the EU is over Euro 50 billion. … 'US farmer cooperatives produce and/or handle more than thirty percent of the commodities, products produced and processed, and inputs purchased in the agri-food chain – equivalent to more than USD 100 billion annually.'

Supplying the world with sufficient food is a major challenge, even though there were recently no major, world wide, shortages. This is not self-evident. Ruttan (2002, p161): 'During the second half of the twentieth century, world population more than doubled – from approximately 2.5 billion in 1950 to 6.0 billion in 2000. The demands placed on global agricultural production arising out of population and income growth almost tripled. By 2050, world population is projected to grow to between 9 and 10 billion people.' An important reason for being able to meet the demand for food is of course technical progress, but the organization of food production plays also a major role. Ruttan (2002, p180): 'If the world fails to meet its food demands in the next half-century, the failure will be at least as much in the area of institutional innovation as in the area of technical change.' One of these institutions is the cooperative. Studying cooperatives and alternative institutional

arrangements is important because one third of world food production passes through co-operatives (Pattison, 2000).

Hansmann (1996) defines a cooperative in general as a 'patron-owned firm' (p16) firm, where patron refers to 'all persons who transact with a firm either as purchasers of the firm's products or as sellers to the firm of supplies, labor, or other factors of production' (p12). Almost all large firms that have owners are owned by persons who are also patrons. Cooperative structures assist the members in developing common services and gain critical mass necessary for accessing markets and achieving economies of scale. The particular characteristics of a cooperative must be taken into account when evaluating a ccoperative. For example, lender cooperatives, also called investor owned firms, evaluate on returns on investment or market share. Another example is the agricultural cooperative, also called producer / marketing cooperative, where the input providers have control. They have much more diverse objectives than an investor owned firm in order to provide benefits to members and satisfy their needs, with democratic goal setting and decision-making methods, and special methods for dealing with capital and profit. Agricultural cooperatives are the focus of this book.

Agricultural cooperatives have often arisen to provide protection against a large buyer in a local or regional market. They function usually better when the membership is more homogeneous, because it facilitates democratic decision making and the equitable distribution of costs and revenues. However, this homogeneity has come under pressure for at least two reasons. First, agricultural markets have moved from shortage to surplus markets since World War II, despite the growth of world population. Second, fiercer global competition, rapid technological change, and choosier customers are forcing firms to seek more efficient production and distribution structures. In recent years, industries have shown increasing collaboration on issues of product development, quality guarantee systems and improved logistics. Spot markets are being replaced by contract-production and systems of vertical coordination. More coordination and collaboration may lead to improved efficiency in production and distribution channels and to more product and market innovations. These vertical relationships can take many forms, like strategic alliances, long-term contracts, licensing, subcontracting, joint ventures, franchising, cooperatives, and networks.

The general theme of this book is that the choice of governance structure matters. This is not a new phenomenon, which is illustrated by 'The vegetable market' (in Rotterdam) by Hendrick Martenszoon Sorgh on the cover of this book. A number of the themes

depicted in 1662 is still relevant. The woman on the left selling fruits and vegetables shows some fruits with a gently smile, signalling a connection and invitation to the spectator. (Some interpreters of paintings even suggest that ostentatively holding up a fruit refers to the saying that one rotten appel in a basket will spoil them all.) The two colleagues immediately behind this woman discuss the produce the man is pointing at. The second group of two women and a man in the back depicts the exchange of money regarding the produce. Finally, the three persons at the right hand side are involved in certifying the produce (James, 1994, p231).

The current empirical significance of governance structure choice in the agricultural sector is illustrated in three papers with quite different research methodologies. The paper 'Growers' associations and the stability of VTN/The Greenery' by Jos Bijman and George Hendrikse presents a case study regarding the transition of a major fruit and vegetables enterprise in the Netherlands. The paper 'Electronic Reverse Auctions in Demand Chains: Prototype and Experiments in the Fruit Industry' by Erik van Heck adopts an experimental design to investigate the impact of the governance structure reverse auction. Finally, a cross section study regarding the diversification behavior of cooperatives and investor owned firms is presented by George Hendrikse and Aswin van Oijen in 'Diversification and corporate governance'. There are also three contributions regarding cooperative theory. First, Mike Cook, Constantine Iliopoulos, and Fabio Chaddad provide a review of the advances in cooperative theory since 1990 in 'Advances in Cooperative Theory since 1990: A Review of Agricultural Economics Literature'. Barbara Krug focuses on the fascinating governance structure developments in the rural sector in China in 'Commons, Collectives and Corporations. The development and change in China's rural sector'. George Hendrikse and Cees Veerman 'On the Future of Cooperatives: Taking Stock, Looking Ahead' address the influence of cooperatives in the previous century as well as a number of aspects regarding the contingent allocation of authority and the frequency of board meetings. Finally, Bijman and Hendrikse investigate in 'Growers' Associations and the Stability of VTN/The Greenery' the trade-off between innovation and countervailing power in the emergence of grower associations.

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2

Growers' Associations and the Stability of VTN/The Greenery

Jos (W.J.J.) Bijman and George W.J. Hendrikse

Abstract

Changes in the market conditions for fruit and vegetables have induced Dutch co-operative auctions to restructure their sales and marketing activities. Nine auctions merged into VTN (VoedingsTuinbouw Nederland) and established the marketing organisation The Greenery BV. VTN/The Greenery has encountered problems in its relationship with the growers, which may undermine its stability. A model is presented which features the trade-off between innovation and countervailing power for the various growers that are members of VTN.

1 Introduction

The European market for fruit and vegetables has undergone significant changes in the last decade (OECD, 1997). Competition has increased, consumers have become more demanding, technology has made transport and storage more efficient, and the retail business has become much more concentrated. In 1997, the supermarket share of fruit and vegetable retailing was between 60 and 70 percent for most European countries (Brouwer and Bijman, 2001). In the Netherlands the supermarket share of the fruit and vegetable market increased from 50% in 1990 to 65% in 1999 (Jaarboek Detailhandel). Other reasons for increasing competition in the fruit and vegetable markets are the globalisation of the economy and the concomitant economies of scale in logistics and marketing. In order to improve their competitiveness vis-à-vis wholesalers and retailers, producers try to increase efficiency in the production and distribution chain and to enhance product and marketing innovation. For more than a century, the cooperative auction was the dominant marketing mechanism for Dutch fruit and vegetables. The auction is basically an organised market place, where sellers (growers) and buyers (wholesalers and retailers) meet, and where prices are determined by the auction clock. The auction is collectively owned by the growers and its main goal is to get the highest possible price for the produce at the lowest cost for logistic and administrative handling. The cooperative auction has proved to be an efficient marketing mechanism in an industry characterised by many suppliers, many buyers, growers as price takers, standardised products, uniform packaging, and large transparency.

The traditional auction had great difficulty to accommodate the recent changes in fruit and vegetable markets. Increasing dissatisfaction occurred on both the selling and the buying side. The auction, used to sell large numbers of products from anonymous suppliers to anonymous purchasers, was not equipped to exchange information of particular buyers to particular producers. Special demands of the large retailers, for instance in case of sales promotions, could not be met. Retailers increasingly started to look for other sources of supply. Wholesalers working for these retailers had similar complaints. They had to locate buying agents at different auctions at the same time to be able to buy enough produce to supply their clients. Large growers became dissatisfied with the auction system because the cost allocation policy – paying a percentage of sales as auction fee – was subsidising small growers. But most dissatisfaction appeared among those growers that saw new market opportunities for higher quality and speciality products. Several innovative growers left the auction cooperative and established a new growers' association to trade with wholesalers

directly. To deal with the changing market conditions and to stop (large) growers from leaving the auction, nine cooperative auctions merged, in 1996, into a new cooperative called VoedingsTuinbouw Nederland (VTN). All assets and all operations were transferred to a newly established company, The Greenery BV.[1]

This paper assesses the relationship between new growers' associations and VTN/The Greenery. It discusses how the introduction of new functions by The Greenery and the increasing heterogeneity of grower interests affect the relationship between growers and VTN/The Greenery. Both the ownership relationship and the transaction relationship between members firms and cooperative firm will be discussed. The main question answered in this paper is why innovative growers would leave VTN and establish their own growers' associations and how this would affect the stability (i.e., cohesion and viability) of VTN/The Greenery.

The paper is organised as follows. Section 2 focuses on the emergence of new growers' associations in Dutch food horticulture. Section 3 briefly outlines some aspects of the cooperative as a governance structure. Section 4 presents the challenges encountered by VTN/The Greenery from the perspective of governance structure. Section 5 develops a model that features the trade-off between innovation and countervailing power in the problems facing VTN/The Greenery. Section 6 presents conclusions.

2 The rise of growers' associations

In the early 1990s, innovative growers wanted to react to consumer demand for more variety and higher quality products by planting new crop varieties, often in close collaboration with a seed company. They experienced that the auction system did not support such differentiation, for at least three reasons. First, speciality products required a special marketing effort, for which the auction did not have the expertise. Most auctions did not want to start product specific marketing activities, as it did not fit with the traditional policy of anonymous products and collective promotion. In the democratic decision-making process on auction policies, the votes of the innovative growers were far too few to be able to force a change of strategy. Second, while the auction clock may have been a very efficient sales mechanism for generic products, it provided a disincentive for product differentiation. At the auction location, all fruits and vegetables were sorted into quality classes. The lots that were brought before the auction clock represented one quality class, but often

1 Cooperative VTN is 100% shareholder of The Greenery BV

contained products from different growers. This type of bundling affects a grower's production decisions in two ways. Producing for an anonymous market gives an incentive to supply generic products, that is, products demanded by most of the buyers. There is no incentive to meet the special demands of one customer. Moreover, a grower does not have an incentive to increase product quality. As there is always some variation in a quality class, the grower will supply products with quality characteristics that are just above the lower boundary of the quality class. Targeting a higher position in the quality class requires higher production costs but does not give him a higher price. Therefore, the grower does not have an incentive to raise product quality above a level that is just above the lower minimum requirements. Third, because being member of the cooperative auction obliges a grower to supply all its produce to the auction, there was (officially) no opportunity to find an alternative sale channel for the more innovative products. In reality, growers did try out alternative sales channels as they directly contracted a small part of their products with wholesalers, and found out they could receive a higher price.

In reaction to changing market conditions and to dissatisfaction among both suppliers and buyers, several cooperative horticultural auctions started a reorganisation process Bijman et al., 2000). By setting up mediation agencies within their organisation, the cooperative auctions started to facilitate direct contracting between buyers and sellers. Price determination for this kind of sales transaction is no longer done through the auction clock, but by negotiation between auction employees and wholesalers or retailers. As these types of transactions often include agreements for a longer period (usually up to a year), sales mediation has the advantage that demands of individual clients can be rewarded. The producer still has the advantage of being member of a large organisation: benefit from scale economies and protection from contracting risks. Another element of the reorganisation among the traditional auctions is the (further) concentration. The three largest farmer-owned marketing and sales organisations – VTN/The Greenery, Veiling ZON and Fruitmasters – are all the result of recent mergers among regional auctions. Further restructuring is taking place among these organisations, as they shift from selling by auction clock to selling by mediation, and as they engage in wholesale activities (in case of VTN/The Greenery).

Partly in response to the new market opportunities and partly in reaction to the restructuring process of the auctions, growers have set up new associations. Since the early 1990s more than seventy new growers' associations for fruit and vegetables have been established (Bijman, 2002). Even before the merger of auctions, a small number of growers

had left the auction to set up their own associations to bargain directly with wholesalers. But after VTN/The Greenery was established, even a larger number of associations were set up. Once the economies of scale, as they existed in the auction, were no longer important (the auction clock was no longer used; produce was transported directly from grower to wholesaler), growers experienced they could do the bargaining with wholesalers themselves.

Two types of new growers' associations have been established. The first type consists of growers who have left the cooperative auction or cooperative marketing organisation. Already at the end of the 1980s innovative growers contacted seed companies and exchanged information among each other about cultivation and marketing opportunities. As discussed above, the auction organisation was not well positioned to promote such innovation activities. Refusal by the auction organisation to start specific marketing programmes for these speciality products in combination with positive experiences of marketing outside of the auction lead to the decision of several of these innovative growers to establish their own producer organisation. These new growers' associations often take the legal form of 'cooperative' in order to be able to carry out commercial activities on behalf of their members. For their sales activities these independent growers' associations often hire sales personnel. Other activities taken up by the new cooperatives are quality inspection, sorting, packaging and marketing. They focus on the top segment of the fruit and vegetable market and have their own brand. Some contract directly with retailers, others trade with wholesalers. Examples of these new cooperative growers' associations are Sweet Color Pepper, Fossa Eugenia, Quality Queen Growers Group and Rainbow Growers Group.

The second type of new growers' associations is primarily an interest and bargaining organisation. Those members of The Greenery, ZON or Fruitmasters that produce the same crop or crop variety have established an association to defend their interests within the large marketing organisation. The desire to more actively express crop specific interests is the result of the increasing heterogeneity and the (perception of a) lack of influence among the members of the restructured auction. The mergers have increased the geographical and psychological distance between members and cooperative marketing organisation. Particularly The Greenery is actively pursuing a strategy of service provider to major retail clients, which implies keeping its members/suppliers at a greater distance from strategic and operational decision-making. In addition, the marketing efforts of The Greenery may lead to conflicts of interests between various products. Management effort is a scarce good, and (human) investments to promote one product are not necessarily equally

beneficial to other products and thus to other producers. Finally, the board of directors of the cooperative is no longer deciding on operational matters (as was the case in traditional cooperative auctions), and limits its control of the management of the marketing organisation to the strategic decisions. In sum, changes in scale of operation, in activities and in decision-making structure were reasons for growers/members to establish new organisations to better express their product-specific interests.

3 Governance structure

The rise of new growers' associations in Dutch horticulture has made life more complicated for the restructured auctions. The traditional auction had a uniform function: selling the members' products against the highest price possible. The auction clock determined prices, and the auction organisation had no direct influence on the outcome. The auction was organised as grower-owned cooperative and the decision-making process in the cooperative was relatively easy as all growers had equal interests. In other words, the traditional cooperative auction had a very homogeneous membership. All this, however, has changed because of the new functions – particularly wholesale and marketing – that some of the auctions have taken up and because of the new growers' associations that have been established 'within' the membership of the restructured auction. To understand the economic effects of these changes we will first explain the governance structure of the cooperative auction. In the next section, we will assess how the working of this structure has been affected by the new relationship between growers and the cooperative marketing and sales organisation.

The governance structure of an organisation allocates income rights and decision rights, that is, it determines who receives income from the use of the organisation's assets and who may decide over these assets (Hansmann, 1996). Other governance attributes are the supply of equity capital, the assignment of ownership title, and the owners' control of the management. If we take the investor-owned-firm as the standard (which is often done in economic organisation theory), a cooperative has a deviant ownership structure and a deviant control structure. The differences in governance attributes result from the goal of the organisation: an investor-owned firm is to give its owners the highest return on investment, while the primary goal of a cooperative is to provide the best service to its members (against the lowest costs).

Farmers have founded cooperatives in order to provide them with particular services, for instance processing and marketing of farm products. A marketing cooperative is

a form of vertical integration, where producers in one stage of the production and distribution chain collectively own assets in another stage of the chain. The explanation for farmer-ownership of the processing and marketing enterprise can be found in the transaction cost and incomplete contract theory. As contracts are always incomplete – because of the bounded rationality of people – ownership matters for decisions on the use of specific assets (Williamson, 1985). Incompleteness of contracts leads to incomplete incentive alignment and gives room for opportunistic behaviour. This commitment problem is most serious when significant investments in specific assets have to be made. These are assets that generate a higher surplus in a specific contractual relationship. The problem with relationship-specific assets is that much of the value of the investment depends on the behaviour of the other contract party, which opens the possibility of various sorts of ex post opportunistic behaviour endangering the investment. This risk is called the hold-up problem (Klein et al., 1978). By assigning to farmers the ownership of the assets in the processing and marketing stage of the production and distribution chain, the risk of hold up by a processing and marketing firm is eliminated.

Farmer-ownership of a cooperative enterprise has two important characteristics: it is collective and it lies exclusively with the members. The collective ownership means that ownership rights are not assigned to any member individually, but are held by all members together. Most cooperatives do not have tradable property rights. Ill-defined, non-tradable or not well-protected property rights lead to inefficient decisions (Milgrom and Roberts, 1992), such as inefficient investments. Cook (1995) distinguishes three investment related efficiency problems in farmer-owned cooperatives: the free rider problem, the horizon problem, and the portfolio problem. The free rider problem occurs if not the investor but someone else benefits most from the investment. The horizon problem rises if the pay-off period for the investment does not correspond with the duration of the membership. Finally, the portfolio problem means that individual members cannot adjust the size of their investment in the cooperative to their personal risk preference. These disadvantages of collective ownership weaken the incentive for members to supply additional equity capital. This problem is most serious when the cooperative has to make substantial and risky investments.

4 The challenges for VTN/The Greenery

Of the three new cooperative marketing and sales organisations that were formed by merging and restructuring fruit and vegetable auctions, VTN/The Greenery has experi-

enced the most profound changes, both internally and externally. When VTN/The Greenery was established in 1996, the business plan stated five goals: to reduce costs, increase scale of operation, add more value, enhance market orientation, and improve co-ordination in the production and distribution chain (VTN, 1996). While these goals seem straightforward, their implementation turned out to be rather difficult. VTN/The Greenery experienced challenges in its relationship with growers as well as with buyers, in its financial situation, in the operation of the price determination mechanism, and in implementing new marketing programmes.

Price determination

Traditionally, a cooperative auction has only one mechanism for price determination: the auction clock. Invented in the year 1903, the auction clock has proved to be a very efficient determination price mechanism. In recent years new price mechanisms were introduced, such as contract mediation. Greenery personnel negotiate with major clients about prices and quantities. On a small scale, The Greenery has also started a third price determination mechanism: unilaterally setting a price and inviting buyers to make a bid for a certain quantity. Contract mediation and unilateral price setting require growers to trust Greenery negotiators. Under the auction clock, price determination was very transparent: a grower could see which price was the best possible in the market of that day. However, under the new price determination systems, Greenery negotiators have to bargain with buyers. Initially, growers were not convinced that they received the best price possible, because negotiators were inexperienced, price determination was secretive, and prices obtained were actually lower than what was obtained at other auctions (while growers expected higher prices after the merger). Even after the early years of gaining experience, trust in the capabilities of the sales personnel continues to be much more important than it ever was in the traditional auction.

Marketing and promotion

The traditional cooperative auctions did not have explicit marketing policies. Promotions, commercials and other forms of advertising were carried out by all fruit and vegetable auctions together (by CBT[2] and the Product Board for Horticulture). Most Dutch fruit

[2] CBT = Centraal Bureau Tuinbouwveilingen, a federative cooperative providing marketing services to 22 member cooperative auctions.

and vegetables were sold under the "Holland" label, that used to have an image of quality until the early 1990s when Dutch vegetables were discredited in Germany, the main export market. The Greenery has taken a more offensive strategy in marketing, for instance by establishing the greenery as a brand name. All products from The Greenery will carry this logo that stands for quality and expertise. However, selling under the greenery label poses several challenges. Will the greenery become a premium brand that consumers ask for in the shop, or will it only provide consumers an image of quality without bringing the customer loyalty that normally goes with a strong brand name? Establishing a premium brand is a costly and risky investment and it may also be quite difficult for products that can vary in (seasonal) availability, in price, and in quality. An additional challenge comes from the growers' associations that have introduced their own brand names. Having two brands on the same product does not seem to be an efficient marketing strategy.

Growers-management relationship

The reorganisation and merger of the auctions had tremendous organisational consequences: several locations were closed, logistic structures and procedures were redesigned, employees were given different tasks, and new (and inexperienced) employees were hired. Growers were confronted with changes in delivery conditions, as well as with a different way of communicating with the new organisation. Communication between growers and the management has previously been direct, and growers influenced auction policies substantially. After the merger, both the geographical and the psychological distance between growers and management increased. Arrogant managers created psychological distance. In its early years, the management of The Greenery – most of them recruited from outside the agrifood sector – used a top-down way of communicating with growers. Growers were told that the marketing of their products was now the sole responsibility of The Greenery and that they were mere suppliers. Discontent among growers led to a sharp reduction in the number of members. In 1996 VTN started with approximately 10.000 members. At the end of 2000 VTN had about 4000 member firms (The Greenery Annual Report 2000).[3] Fewer VTN members means a loss of turnover for The Greenery.

Decision-making structure and process

[3] Part of the reduction from 10,000 to 4,000 can be attributed to a different way of counting: formerly membership was by individual person; nowadays membership is counted by farm. Two or more persons holding one farm are now counted as one member.

The founders of VTN/The Greenery introduced a separation between decision-making in the cooperative society (VTN) and in the commercial enterprise (The Greenery). They were aware of the disadvantages of decision-making in cooperatives, such as time consuming and lack of expertise among board members. Substantial opposition from growers was expected, which had to be channelled into VTN meetings instead of interfering with the day-to-day management of The Greenery. However, the formal separation between VTN and The Greenery made it very difficult for growers to influence management decisions, which was an additional reason for growers to leave the cooperative. In order to stop this process, action was eventually taken by the VTN board of directors, and the CEO of The Greenery was forced to resign. Other members of the board of managers had already left, or were soon to leave. Within two and half years of its existence, all six members of the management board of The Greenery had been replaced. VTN drew two major lessons from this experience. First, the newly appointed CEO had to have experience in the agricultural sector. Second, a personal link had to be established between the board of directors of VTN and the supervisory board of The Greenery. Five members of the board of VTN (including the chairman) are now also members of the supervisory board of The Greenery.

Ownership and financing

In a cooperative the members are the owners of the firm, and therefore provide equity capital. When non-members were to supply equity capital, a conflict of interests can occur between members/users of the cooperative and other owners who want the highest return on their investment (Hendrikse and Veerman, 2001). The common method of increasing equity capital in a cooperative is retained earnings. As the Greenery has ambitious marketing plans, additional equity capital is required. By increasing turnover and lowering costs, it was expected that additional earnings could be retained without too much burden for the growers. However, the reorganisation turned out to be more expensive and turnover decreased, due to lower prices for horticultural produce and growers leaving the cooperative.

Still, the management of The Greenery wanted to gain control over the marketing channel by establishing direct contact with major retailers. In order to implement this strategy, it needed a position in wholesaling. In 1998, VTN/The Greenery bought two large wholesale companies: Van Dijk Delft Group, and the Fresh Produce Division of Perkins Food Plc. These wholesalers were suppliers of major retailers in Germany and the UK. The 310 million euro acquisition was wholly financed through debt capital. To improve its

solvability, The Greenery went looking for additional equity capital. As VTN did not want to invite outside capital because that would mean a loss of control rights, the money had to come from VTN members. However, members have not been eager to supply the additional funds; they need the money in their own farms, and may consider investment in The Greenery too high a risk. Still, to improve its liquidity position, VTN/The Greenery has introduced an obligatory subordinated loan for all members.

Innovation and differentiation

Part of The Greenery strategy is to develop and market new products. Product innovation used to be the domain of the plant breeder together with the growers. Improvements in plant breeding and agronomic requirements by growers were the main factors influencing the development and introduction of new plant varieties. Nowadays, product development is much more focussed on consumer demands. New innovation goals require changes in the organisation of product development, like closer collaboration among seed companies, growers and marketing organisations. The Greenery is promoting this collaboration in the production and distribution chain. However, innovation activities by The Greenery raise questions about the distribution of risk and revenues. Because The Greenery is marketing a broad range of products, it may take different decisions than individual growers or growers' associations would. As a result, difficult bargaining may occur over which new products should be introduced, who should carry most of the risk, and how extra revenues should be divided.

Relationship with customers

The old auction followed a policy of attracting as many buyers as possible. The larger the number of buyers present at the auction, the higher the price would be. Auctions were competing with each other in attracting buyers, for instance by offering attractive conditions for renting office and storage space at the auction premises. The Greenery followed a different strategy. For efficiency reasons, it concentrated its activities at a few locations, where there was not enough space for all the buyers. As The Greenery was shifting its sales process from the auction clock to contract mediation, it preferred to deal with a smaller number of buyers. The Greenery made a distinction between preferred buyers and others, the latter being faced with adverse sales or logistic conditions. Wholesalers not belonging to the group of preferred buyers looked for other ways to obtain their merchandise. They contracted directly with growers and growers' associations. As a result, growers had more options to sell their produce outside the auction, which made it easier to leave VTN.

These challenges for VTN/The Greenery show that the new relationship between growers and marketing organisation is substantially different from the traditional grower-auction relationship. While the interests of the growers in the traditional auction were homogeneous, the new relationship can be characterised by greater heterogeneity. Greenery activities have become more heterogeneous because of differentiation in price determination mechanisms and in marketing efforts. Not all members may benefit from these (new) activities in the same way, thus creating differentiation in grower interests. At the same time, growers have started to produce more differentiated products for which they demand product-specific marketing efforts by The Greenery.

Despite this heterogeneity and the strain it puts upon the grower-Greenery relationship, there may be good reasons for growers to continue membership of the cooperative marketing and sales organisation. The main reason lies in the size of the cooperative, which stands for economies of scale, a broad product portfolio and a certain amount of market power. While the traditional auction benefited from economies of scale in the selling process and in logistic functions, The Greenery is seeking economies of scale in its marketing investments. A broad product portfolio is nowadays of great importance because the major clients of the marketing and sales organisation are the large European retailers, who only want to trade with suppliers that can deliver the full range of fruit and vegetables, and preferably year-round. Gaining market power is important in fruit and vegetables markets, as the food retail industry has become very concentrated.

Despite the advantages of scale in a large marketing and sales organisation, some growers prefer to establish their own growers' association and trade directly with wholesalers. This raises the question which growers will prefer the small association and which will continue their membership of the large cooperative. The following section presents a theoretical analysis of the pros and cons of being a member of a large cooperative marketing and sales organisation. The choice is here presented as one between market power and innovation. Market power stands for the advantages of the size of the large cooperative organisation. Innovation refers to the advantages of investing in the development of high quality products.

5 Innovation versus market power

A distinguishing feature of a growers' association[4] is the equality principle regarding the distribution of revenues as well as the delivery of output. The equality principle regarding the distribution of revenues entails that each member receives the same remuneration for a unit of output that is sold, regardless the quality of the product[5]. If a grower does not produce, then no remuneration is received. The equality principle regarding the delivery of output entails that a certain quantity of customer demand is met by proportionally delivering from the output of each grower, regardless the quality. The principle of equal treatment serves to prevent the distribution of the cooperative gain from becoming a 'political' issue, which might endanger the cohesion of the (voluntary) organisation (Søgaard, 1994).

We distinguish homogeneous and heterogeneous growers' associations. All members in a homogeneous association are identical, that is, they all produce the same amount of output and the quality of this output is identical. A heterogeneous association consists of at least two types of members. We assume that each member produces the same amount of output, but the quality of the output differs.

Innovation

Suppose that there are two types of growers. Grower 1 produces one unit with value A and grower 2 produces one unit with value B. Assume A > B, that is, growers of type 1 deliver products with high value and growers of type 2 produce low value products. The value of the product of the grower will only be realised when a third party is involved, for instance a wholesaler.

Cooperative game theory[6] will be used to analyse the effect of the choice of association. A cooperative game is summarised by the characteristic function, which consists of a set of players and a specification of the pay-off for every possible subset of the set of players. Three players are distinguished. Grower 1 is player 1, grower 2 is player 2, and the wholesaler is player 3. The type of association determines the pay-off of a coalition of

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[4] Here, the definition of a growers' association includes a grower-owned cooperative.

[5] Fresh produce is sorted into quality classes; therefore our analysis applies to products within a particular quality class.

[6] Cooperative game theory has nothing to do with (agricultural) cooperatives. Cooperative game theory (as opposed to non-cooperative game theory) is a mathematical tool, which starts from the assumption that the parties in the game are willing to collaborate (Hendrikse, 1998).

players. The outcome or equilibrium of a cooperative game is a specification of a pay-off for every player. As equilibrium concept we use the Shapley value (Shapley, 1953). It is an indication of the power of each player and therefore an indication of the incentive to invest of each party.

The characteristic function of a homogeneous association is N= {1,2,3}, v(Ø) = 0, v(1) = 0, v(2) = 0, v(3) = 0, v(12) = 0, v(13) = A, v(23) = B, v(123) = A+B. The Shapley value is (A/2, B/2, (A+B)/2), that is, party 1 receives A/2, party 2 receives B/2, and party 3 receives (A+B)/2. The analysis of a heterogeneous association is facilitated by defining I = {1,2}, that is, I is the coalition of all growers. The characteristic function of a heterogeneous association is N= {I,3}, v(Ø) = 0, v(I) = 0, v(3) = 0, v(I3) = A+B. The Shapley value is ((A+B)/2, (A+B)/2). Dividing (A+B)/2 equally over party 1 and 2 results in the Shapley value ((A+B)/4, (A+B)/4, (A+B)/2).

Proposition 1: Grower 1 has a stronger incentive to invest in (i.e., being a member of) the homogeneous association than in the heterogeneous association.
Proof: $A/2 = (A+A)/4 > (A+B)/4$ because $A > B$.

Proposition 2: Grower 2 has a weaker incentive to invest in the homogeneous association than in the heterogeneous association.
Proof: $B/2 = (B+B)/2 < (A+B)/4$ because $A > B$.

The equality principle regarding income distribution in associations results in an incentive to underinvest for the high quality grower in a heterogeneous association. This will result in a process of adverse selection in a heterogeneous association, which means that the high quality growers will leave the heterogeneous association and will establish a homogeneous association consisting of only high quality growers.

Proposition 3: The power of the wholesaler is the same in each association.
Proof: The Shapley value of the wholesaler is (A+B)/2 in the homogeneous as well as the heterogeneous association.

Market power

Proposition 3 entails that the power of grower 1 and 2 together is the same in each association. They receive together half of the total surplus. There is in the above model no

change in the distribution of market power for the growers collectively when they switch from a homogeneous to a heterogeneous association. The reason is that the total supply of the growers is equal to the total demand of the wholesaler.

The effect of the choice of association on the distribution of market power can be captured by reducing the demand of the wholesaler. This provides the wholesaler with opportunities to create competition between the growers. Suppose that the wholesaler wants to buy only one unit of the product of the growers, whereas each grower is still producing one unit. The characteristic function of the homogeneous association in this market with an abundance of supply is N= {1,2,3}, v(Ø) = 0, v(1) = 0, v(2) = 0, v(3) = 0, v(12) = 0, v(13) = A, v(23) = B, v(123) = A. The Shapley value is (A/2–B/3, B/6, A/2+B/6). The characteristic function of the heterogeneous association is N= {I,3}, v(Ø) = 0, v(I) = 0, v(3) = 0, v(I3) = A+B)/2.[7] The Shapley value is ((A+B)/4, (A+B)/4). Decomposing this vector into the two growers results in ((A+B)/8, (A+B)/8, (A+B)/4)).

Proposition 4: The homogeneous association creates more value than the heterogeneous association.

Proof: v(123) = A > v(I3) = (A+B)/2 because A > B.

Proposition 5: The wholesaler has more power with the homogeneous associations than with the heterogeneous association.

Proof: The Shapley value of the wholesaler with the homogeneous associations is A/2+B/6, while the total value is equal to A. The Shapley value of the wholesaler with a heterogeneous association is (A+B)/4, while the total value is (A+B)/2. The wholesaler has more power with the homogeneous associations than with the heterogeneous association because (A/2+B/6)/A = 0.5+B/6A > ((A+B)/4)/(A+B)/2 = 0.5.

The heterogeneous association can be considered as a merger of homogeneous associations. It creates countervailing power towards the wholesaler, which the latter does not like. The creation of homogeneous associations undermines the countervailing power (i.e., the market power) of the growers collectively. This is attractive for the wholesaler. The growers obtain half of the total value with a heterogeneous association (i.e., (A+B)/2),

[7] Notice that the equality principle regarding the delivery of output is responsible for v(I3)=(A+B)/2.

whereas they receive collectively less than half of the total value in homogeneous associations (i.e., A/2-B/6).

Proposition 6: Grower 2 prefers the heterogeneous association.
Proof: The Shapley value of grower 2 is (A+B)/8 in the heterogeneous association. The Shapley value of grower 2 is B/6 in the homogeneous association. Grower 2 prefers the heterogeneous association above homogeneous association for every value of A and B because $(A+B)/8 > (B+B)/8 = B/4 > B/6$.

The equality principle as well as the countervailing power principle of a heterogeneous association is beneficial for grower 2.

Proposition 7: Grower 1 prefers the homogeneous association above the heterogeneous association when $9A/11 > B$.
Proof: Grower 1 prefers the homogeneous association above the heterogeneous association when $(A/2–B/3) > (A+B)/8$, that is, $9A/11 > B$.

Grower 1 prefers the heterogeneous association when the difference between the two growers is not too large. The disadvantageous effect of the equality principle in the heterogeneous association for grower 1 is not large enough to eliminate the advantageous countervailing power effect. However, current developments in agrifood markets, favouring differentiation and higher quality, seem to indicate an increase in the difference between A and B. Proposition 7 implies that the high quality growers will form a homogeneous association in order to escape the equality principle of a heterogeneous association. The benefit of adverse selection for the high quality growers is larger than the loss of countervailing power. The wholesaler gains in two ways from this adverse selection effect. First the size of the total pie increases from (A+B)/2 to A. Second, the wholesaler will obtain a larger share of the pie because there are now two associations instead of one, which results in competition between the two homogeneous associations.

6 Conclusions

Changes in the market conditions for fruit and vegetables have induced Dutch cooperative auctions to reorganise their sales and marketing activities. In 1996, nine auctions merged into the new cooperative marketing and sales organisation VTN/The Greenery.

The new organisation subsequently became a wholesale company. Compared to the traditional auctions, VTN/The Greenery has more members, covers a larger geographical area, sells a wider range of products, and carries out many more activities. As a result, the interests of the members vis-a-vis their cooperative have become more divers. This heterogeneity is one of the major challenges for the new cooperative, as it conflicts with the traditional governance attributes of collective ownership and democratic decision-making. In addition, innovative and large growers have left the cooperative to establish their own growers' association and to trade with other (non-cooperative) wholesale companies. The effect of members resigning is a loss of turnover and a loss of innovativeness among the membership as a whole. This reduces the market power and economies of scale of the cooperative marketing and sales organisation. In the end, it undermines the stability (i.e., cohesion and viability) of VTN/The Greenery. For the growers that have established their own (small) association the incentive to invest in product innovation and quality improvement are enhanced. Growers therefore have to choose between being member of a large cooperative marketing and sales organisation characterised by a certain degree of market power, and economies of scale in risk sharing, marketing and logistics, and being member of a small growers' association characterised by smooth decision-making and strong incentives for innovation. Whether market power or strong innovation incentives are more important for total grower income depends on the extent of consumer valuation of product differentiation.

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3

Innovative Electronic Reverse Auctions in Demand Chains: Prototype and Experiments in the Fruit Industry

Eric van Heck

Abstract

Exploiting the Internet for commercial ends has become a key theme for most organizations. There are significant advantages for both buyers and sellers in using this medium. Savings are made as a result of reducing transaction costs, increasing the circle of potential customers, and improving the search-and-find capabilities for all parties concerned. In this article we explore how Internet will be used with regard to auctions. Three different business models are analyzed for a Dutch fruit cooperative in the fruit industry. The first one is the traditional supply driven Dutch auction mechanism. The second one is the bilateral brokerage system. The third model is a new concept: the demand driven reverse Dutch auction system. A prototype of the reverse Dutch auction is developed and experiments are carried out. The results of the experiments indicate that there are potential benefits for buyers, sellers, and the cooperative. The results indicate that the reverse auction system will have a significant impact on the price levels of the traded products. Recommendations for further research are presented.

Keywords: Chain Management, Dutch Auction, Electronic Markets, Experimental Economics, Fruit Industry.

1 Introduction

The rapid developments in information and communication technology (ICT) and its applications in business have resulted in electronic markets being increasingly popular. Significant benefits are obtained by reducing transaction costs, increasing the circle of potential customers, and improving the search-and-find capabilities for all parties concerned [Van Heck, 2000; Van Heck and Vervest, 1998]. An electronic market is defined as an inter-organizational information system through which multiple buyers and sellers interact to accomplish one or more of the following market-making activities: (1) identifying potential trading partners, (2) selecting a specific partner, and (3) executing the transaction [Choudhury, et al., 1998]. Examples include airline reservation systems such as SABRE and APOLLO [Copeland and McKenney, 1988]; AUCNET for the sale of used cars [HBS, 1988]; TELCOT in the cotton industry [Lindsey et al., 1990]; Inventory Locator Service (ILS) in the aircraft parts industry [Choudhury, et al., 1998], and numerous auction examples on the Web (for example Chemconnect.com, eBay.com, FreeMarkets.com, Pefa.com). The primary benefit offered by an electronic market is efficient market search, or electronic brokerage [Malone et al., 1987]. The impact of these lower search costs might result in dis-intermediation in the marketing channel and commoditization of the market, resulting in increased price competition [Bakos, 1991; Bakos, 1997; Malone et al., 1987]. However, little empirical evidence exists to support these claims. Choudhury et al. [1998] analyzed an electronic market in the aircraft's part industry and show that current models do not adequately capture the complexity of electronic markets. For instance, while ILS sometimes helped buyers to find a better price, in other cases it helped suppliers extract an extra premium by providing more accurate information on parts availability. ILS also had little impact on the extent to which brokers are used, although the specific nature of the value added by brokers appears to be changing. Finally, inventory levels in the industry have been unaffected by the use of ILS. However, as Choudhury et al. also describe, the ILS electronic market is limited in scope. It includes the capability of helping a firm to identify a set of potential trading partners for a transaction. In ILS it was not possible to select and execute a transaction. So caution must be exercised in generalizing the findings to systems that also support selection and execution. Therefore the impact of ILS on prices could not be measured directly.

Given the preliminary state of current knowledge and evidence on the impact of electronic markets it is the belief, expressed also by Choudhury et al. [1998], that the ap-

propriate strategy for gathering empirical evidence is not a broad based survey but rather in-depth studies of multiple electronic markets. The underlying premise in advocating this approach is that the use and impact of electronic markets may be influenced by product, transaction, system, and industry attributes that have not been identified in the literature to date. As Choudhury et al. [1998] points out 'a cumulative body of case evidence that helps to identify these variables needs to be built'. In this paper we take a step toward that objective with a study of electronic markets, which support identification, selection and execution: electronic auctions in the fruit industry. Electronic markets in the fruit industry are particularly interesting due to the perishable nature of the product with high time-specificity and complex product descriptions.

The paper begins by presenting a stakeholder/process framework. This framework is useful in analyzing electronic markets. In section 3 a case study on (electronic) markets in a fruit industry related to an anonymous fruit cooperation is presented. It is concluded that the traditional Dutch auction mechanism is successful in supply-oriented chains. These auctions use the "Dutch auction" as price discovery process. In a Dutch auction the auctioneer offers products at successively lower prices until his offer is accepted. The Dutch method offers advantages, as the fruit auctions reveal. The Dutch method is much faster and tends to generate higher prices. However, in the fruit industry the use of the Dutch auction is declining and replaced by the brokerage system, where buyers and sellers in bilateral negotiations come to a deal. In bilateral negotiations buyers can in a better way specify their demand. However, its weakness is that it tends to generate lower prices and makes the market less transparant. Therefore a third system is proposed: the demand-driven reverse Dutch auction. Section 4 describes the prototype of the innovative auction system and its characteristics. Experimental research is carried out with this prototype. Results of one of the experiments are presented. The paper concludes in section 5 with implications and suggestions for further research.

2 Analyzing exchange organizations

Kambil and Van Heck [1998; 2002] specified a generalizable model of exchange processes and developed a process-stakeholder benefit analysis framework to evaluate alternative market designs. In this framework, see Figure 1, five basic trade processes (search, pricing, logistics, payments and settlements authentication) and five trade context processes (product representation, regulation, risk management, influence, and dispute

resolution) are distinguished. The processes related directly to executing trade of any kind include:

Search processes that allow buyers and sellers to discover and compare trading opportunities

Pricing processes to help buyers and sellers discover prices

Logistics processes that coordinate the transfer of physical and digital goods between buyers and sellers

Payment and settlement processes to transfer funds from buyer to seller

Authentication processes to verify the quality of the goods sold and credibility of the buyers and sellers.

Five additional trade context processes enhance trust among trading parties and legitimize trade. These include:

1. Product representation processes that specify the presentation of products and services to buyers and sellers
2. Regulation processes that record and recognize the transaction within a framework of laws and rules to signal it as legitimate and conforming to a set of market rules and social principles
3. Risk management processes to reduce buyer and seller risks in a transaction
4. Influence processes to ensure that commitments among trading partners are met
5. Dispute resolution processes that resolve conflicts among buyers, seller, and market makers such as auction houses

The communications and computing process enables integration of all other trading processes into specific markets for buyers and sellers.

This framework is applied to analyze three business models in the fruit industry in particular related to a large fruit cooperative. The framework is already frequently used in analyzing a number of ICT initiatives in the Dutch flower markets; see Van Heck [2001], Van Heck et al. [1997] and Van Heck and Ribbers [1998].

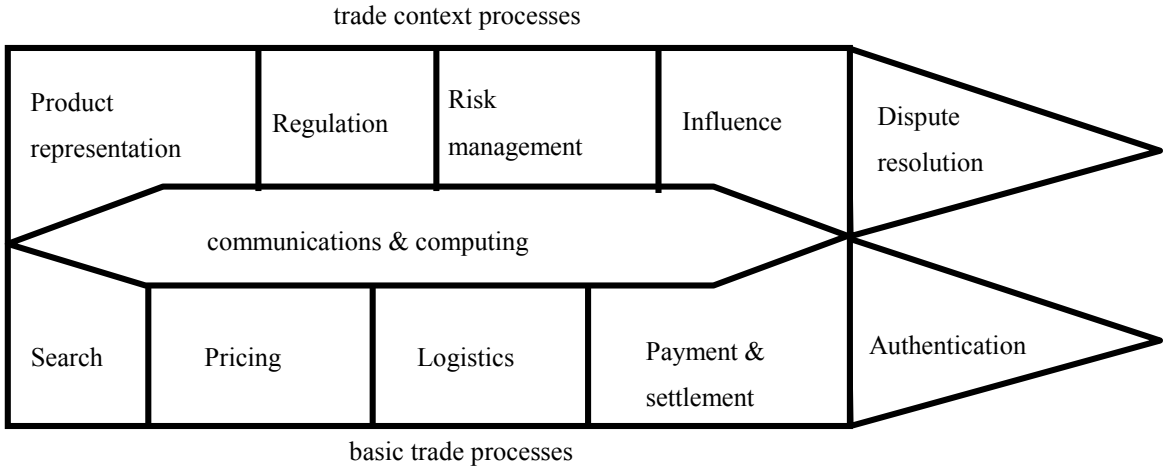

Figure 1. Generalized model of exchange processes [Kambil and Van Heck, 2002].

3 Case study in the fruit industry

In this section we will discuss the characteristics of the fruit industry and the investigated fruit cooperation and the strengths and weaknesses of the three business models.

The Fruit Industry and Cooperative

The fruit industry in the Netherlands produces all kinds of fruits. Apples and pears are the dominant products. For the soft fruits strawberries, blue berries and cherries are among the popular products. Fruit products are produced by growers, which are members of a cooperative. The case study is executed for one of the main cooperatives in the Netherlands. The fruit cooperative has four types of clients: wholesalers, retailers, exporters and commissioners. Almost 60% of the trade of fruit in the Netherlands is done via retailers. On the supply side there are 3,000 growers of whom 1,400 are a member of the cooperative. The fruit cooperative uses at the moment two trading systems: the Dutch auction clock system and the brokerage system. The first type can be characterized as a sales auction between one seller (one grower) and many buyers, see Figure 2, and is mainly supply driven. The second business model can be characterized as a bilateral negotiation model among one seller (one grower) and one buyer, and is demand driven.

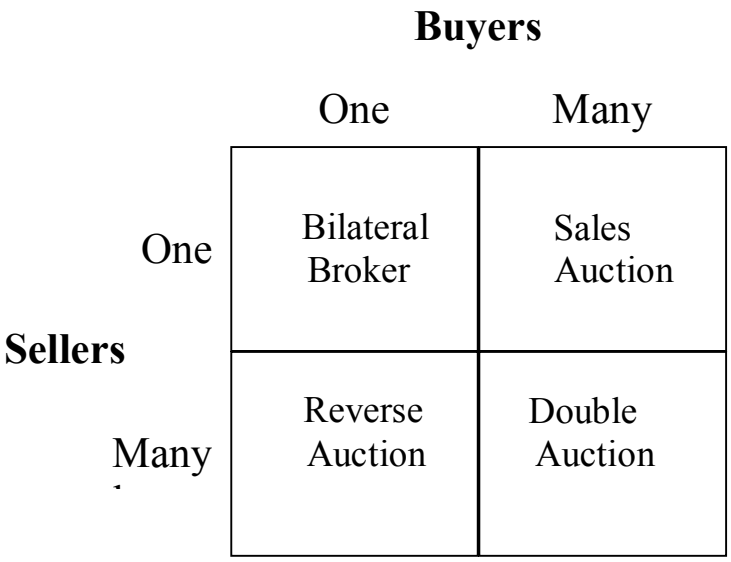

Figure 2: The use of Auctions on the Web
(Van Heck & Vervest, 1998)

The Broker System

In the brokerage system the cooperative acts as a broker between buyer and grower. Buyers who would like to have a stable price in a forward market tend to favor the brokerage system. They specify the amount and quality of the products and the delivery date and come to deal with one grower or a group of growers. The advantage for the grower is that the grower is less dependent of the uncertain outcome of the auction clock in terms of price. The disadvantage of the brokerage system is that the market becomes less transparent and therefore it is uncertain if the negotiated price reflects the supply and demand in the market.

The Sales Auction System

Dutch fruit auctions use a clock for price discovery, as follows. The computerized auction clock in the room provides the buyers with information on producer, product, unit of currency, quality, and minimum purchase quantity. The clock hand starts at a high price determined by the auctioneer, and drops until a buyer stops the clock by pushing a button. The auctioneer asks the buyer by intercom, how many units of the lot he or she will buy. The buyer provides the number of units. The clock is then reset, and the process begins for the left-over, sometimes introducing a new minimum purchase quantity, until all units of the lot are sold. In the traditional way buyers must be present in the auction room. In practice, it turns out that the Dutch auction is an extremely efficient auction mechanism: it can

handle a transaction every four seconds. The disadvantage of the Dutch auction clock is that it is a spot market which is supply oriented.

The Reverse Auction System

Based on the weaknesses of the Dutch auction clock (spot market and supply driven) and the brokerage system (demand driven but less transparant and also slow) a third system is in this paper developed. It is reverse auction system, where the grower is bidding on the demand of the buyer. This system can replace the brokerage system. So, at the end there will be a spot market with the traditional Dutch auction clock system and a forward market with this new reverse auction system. A key element is that the reverse auction is used internally – among the members of the fruit cooperative. In section 4 we present more details.

The Double Auction System

In the double auction both buyers and sellers provide bids to indicate supply and demand. The buyers and sellers each submit bids consisting of both a price and a desired quantity to an auctioneer. The auctioneer matches the seller's offers to the buyer's offers until all quantities offered for sale are sold to the buyers [Kambil and Van Heck, 1998]. Double auctions are successfully used in the trade of stocks and bonds, and the trade of commodities. This system is not taken into account in this study due to fact that it is more complex compared with the other systems and a prerequisite of this system is that both sellers and buyers have to indicate their preferences in the same time period.

Table 1: Characteristics of three business models in the fruit industry

Variables	Indicators	Traditional Dutch auction clock system	Brokerage system	New Reverse auction system
General Parameters	Intermediary	Fruit cooperative	Fruit cooperative	Fruit cooperative
	Sellers	growers as member of cooperative	growers as member of cooperative	growers as member of cooperative
	Buyers	Wholesalers/ Retailers	Wholesalers/ retailers	Wholesalers/ Retailers
	Products	Fruit	Fruit	Fruit
Basic Trade Processes	Search	Buyers can have a look in the storage rooms	Buyers can have a look in the storage rooms	Sellers can search demand data base
	Pricing	Dutch auction clock	Bilateral negotiation	Reverse Dutch auction clock
	Logistics	Via auction room to buyer's place	Directly from grower's to buyer's place	Directly from grower's to buyer's place
	Payments and settlements	Within 24 hours; guaranteed by intermediary	Within 24 hours; guaranteed by intermediary	Within 24 hours; guaranteed by intermediary
	Authentication	Quality grading on lot	Quality grading on sample	Quality grading on lot
Trade Context Processes	Communication and computing	Computerized clock in room	Computerized database and email connection with growers and	Computerized clock on PC screen, no digital image on PC screen

			buyers	
	Product representation	Real lot on site	Sample of lot	Quality data on screen
	Regulation	By intermediary	By intermediary	By intermediary
	Risk management	By intermediary	By intermediary	By intermediary
	Influence	Growers are owner of intermediary	Growers are owner of intermediary	Growers are owner of intermediary
	Dispute resolution	By intermediary	By intermediary	By intermediary
Overall result		Successful for spot products	Successful for forward products	Not yet implemented

4 Prototype and experimental research

The proposed reverse auction system was designed and build into a software prototype, see for more details Leijdekkers [2001]. The main characteristics of the reverse auction system are:

A proposed buyer – usually a wholesaler or a retailer – specifies with the help of the account manager its demand. Demand is not only specified by product characteristics but also by service characteristics like special packaging requirements, delivery options, special treatments of the fruit products, special marketing and PR activities.

The account manager organizes the service elements and for the product organizes an internal reverse auction among the growers of the cooperative. One of the underlying propositions is that the growers together – as members of the cooperative and therefore the basis of the cooperative – try to fulfill the order of the customer. The reverse auction system is the allocation and value determination mechanism.

For the reverse auction a reverse auction clock system is used where the clock starts low – indicating the price – and gets higher.

Growers can stop the clock indicating their willingness to pay that price and also indicate the amount of products they can provide to the buyer. The clock continues until the remaining part of the demand is sold.

When the total demand is met, the account manager finalizes the transaction with the buyer and keeps track of the fulfillment of the transaction. There are two options for paying the growers. The first one is the 'pay-as-your-bid' rule. The second option is that growers are paid the weighted average price. The second option was used in the experiments.

To test and experiment with the reverse auction system several experiments were carried out. In these experiments two extreme situations were analyzed. The first situation was related to the apple market. This market is characterized by over supply. The second situation was related to the pear market, in which there is more demand than supply. Based on a literature review the following hypotheses were formulated, see also [Leijdekkers, 2001]:

Hypothesis 1: A reverse auction system - compared with the traditional sales auction system - will lead to lower prices in a supply-oriented market.

Hypothesis 2: A reverse auction system - compared with the traditional sales auction system - will lead to higher prices in a demand-oriented market.

Web-based System and Experimental Design

In the laboratory experiment we used a web-based auction system. The auction control functions enable the auctioneer to select an auction from the database and execute it. For the platform of the web-based market system we use a TCP/IP network (Internet or Intranet) with 1 server running Windows NT 4.0 Server with Internet Information Server (ISS) version 4 and 20 clients running Windows NT 4.0 Workstation with Microsoft Internet Explorer. CommercePack version 1.5 from InfoCommerce was selected as server application software.

The laboratory experiments take place in the ENECO RSM trading room. This room facilitates electronic trading systems and is equipped with 20 PC's. The experiment was done with 4 subjects on October 2000. Subjects were recruited from graduate business administration and information management classes at Rotterdam School of Management (RSM). Upon arrival in the laboratory, subjects were seated at personal computers, they read the instructions and the instructions were also read aloud, see Appendix 2. Each subject made bidding decisions for 2 trials. In total there were 40 auctions executed. Cumula-

tive earnings were set to the initial level of approx. 5 euro. Subjects were paid at the end of the experiment. The subjects had to sell all their supply for the highest price as possible.

Results

In total there were 40 auctions executed. Twenty rounds dealt with the situation of apple products (Elstar) and a supply driven market. Twenty rounds dealt with the situation of pear products (Conference) and a demand driven market. Due to technical difficulties only 19 auction results of the last situation could be used. The data are presented in appendix 1.

It is analyzed how many auctions resulted in a complete transaction. The results show that for the apple market 15 out of the 20 auctions resulted in a complete transaction and for the pear market 14 out of 19 auctions. Also allocation based on the cost price of the grower was high. In 38% of the apple auctions the first bidder was the bidder with the lowest cost price, for the pear auctions 50% of the cases the first bidder was the lowest cost price bidder. For the apple auctions there are 4 auctions with several bids. In one case there is a high variance in bid levels. In the pear auctions there was more variance. In eight of the nineteen auctions there were several bids. In one auction the bid variance was high ranging between 110 and 137 cents. For both market situations in the reverse auctions the bid variance increased. The reverse auction system is base on the assumption that growers prepare a prediction about the real value of their products given the current status of supply and demand. The analysis of the data showed that the bidders improved their prediction capability during the auctions and were able to bid closer to the intervention price as set by the buyer.

Hypotheses

Hypothesis 1: A reverse auction system - compared with the traditional sales auction system - will lead to lower prices in a supply-oriented market.

Although it is difficult to compare the reverse auction results in the experiments with the real life Dutch auction clock results the comparison shows that for the apple auctions the average traditional Dutch auction price was 62.7 cents/kg for the sales auction results (N=16) versus 65.9 cents/kg for the reverse auction results (N=16). We analyzed the two groups. The results show that there is no significant difference in auction prices between the two groups, see Appendix 3. Therefore, hypothesis 1 is not accepted.

Hypothesis 2: A reverse auction system - compared with the traditional sales auction system - will lead to higher prices in a demand-oriented market.

For the pear market the results were 139.0 cents/kg with the Dutch auction clock system (N=17) and 118.4 cents/kg for the reverse auction situation (N=17). We analyzed again the two groups. The results show that there is a significant difference in auction prices between the two groups, see Appendix 3. Therefore, hypothesis 2 is not accepted but reformulated into:

Hypothesis 2:* A reverse auction system - compared with the traditional sales auction system - will lead to lower prices in a demand-oriented market.

Explanations for the results that bidders in the pear market were bidding lower might be related to the lack of detailed market knowledge. It might be that bidders were more focused on price compared with the quality dimensions of the product. The higher level of reserve prices in this market were also more difficult to obtain and bidders were bidding not too high to avoid that none of their products could be sold.

5 Conclusions and further research

This paper makes three key contributions to the literature on restructuring agricultural cooperatives and chain management. First, we identify a series of distinct processes that underlie exchange relations. We propose and illustrate the use of the process-stakeholder benefit analysis for comparing different forms of trading, and evaluate the impacts on different market participants. The framework was used to identify strengths and weaknesses of the two current business models in the fruit industry.

Second, a third business model – the reverse auction system – was proposed and designed in detail by means of a software prototype. Business rules and bidding rules were made explicit by means of this prototype.

Thirdly, experiments carried out with the auction prototype show that the proposed business model can be used for the fruit chain. The reverse auction system is allocative efficient, will lead to higher bid variance, and will improve the prediction capability of growers. The results show that the proposed reverse auction system might lead to higher prices in a market with over-supply and lower prices in a market with over-demand.

However, this research has several limitations and therefore the results have to be treated with caution. A limited set of experiments was carried out with students as subjects. It is unclear how growers are able to use this type of reverse auctions. The experiments were used with a benchmark of real auction data of some days of the traditional auction. Therefore a more detailed benchmarking need to be examined. So, the next step is to further experiment with growers as subjects and with a more detailed benchmark.

The case highlights new questions for research. As the Internet evolves to a powerful and reliable infrastructure for electronic commerce and business, auctions become more important as a trading mechanism. Although much research is carried out with laboratory experiments – most of the research in experimental economics deals with auctions in laboratory experiments – there is only limited research done with the help of field experiments. The effects of information variables on prices, buyer strategies and net benefits in different auction mechanisms have to be investigated in more detail and in a proper setting. Further research will focus on field experimental research, which will improve the relevance of electronic auction research.

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Appendix 1

This table describes for each of the auction rounds the demand of the apple market: the auction round, the specific product and variety of the Elstar apple, the demanded services, the quantity in kilograms, the start and end price of the auction clock in cents, and the auction results of the traditional auction and the reverse auction in cents per kilogram product.

Demand Elstar				Clock		Result	
Nr	Product	Service	Quant.	Start	End	Sales auction	Reverse auction
1	I; 60-65; MBT	11 kg; Franco	1224	30	68	56,0	-
2	I; 60-65; MBT	12 kg; Veiling	384	30	69	57,0	57,1
3	I; 60-65; MBT	7 kg; Franco	60	30	66	55,0	62,0
4	I; 60-65; MBT	12 kg; Franco	264	30	75	62,0	62,0
5	I; 65-70; TT	7 kg; Veiling	2123	30	75	62,0	52,4
6	I; 65-70; TT	11 kg; Franco	1680	30	72	60,0	59,0
7	I; 65-70; TT	11 kg; Franco	156	30	68	56,0	56,0
8	I; 70-75; MBT	12 kg; Veiling	6600	30	65	54,0	63,0
9	I; 70-75; MBT	7 kg; Franco	2574	30	64	53,0	-
10	I; 70-75; MBT	12 kg; Franco	1728	30	74	61,0	63,0
11	I; 70-75; MBT	12 kg; Veiling	1536	30	72	60,0	68,6
12	I; 70-75; MBT	7 kg; Franco	1104	30	86	71,0	71,0
13	I; 70-75; MBT	12 kg; Franco	1859	30	88	73,0	73,4
14	I; 70-75; MBT	7 kg; Veiling	440	30	77	64,0	-
15	I; 70-75; MBT	11 kg; Franco	660	30	78	65,0	76,0
16	I; 70-75; MBT	11 kg; Franco	1210	30	78	65,0	77,0
17	I; 70-75; MBT	12 kg; Veiling	990	30	81	67,0	77,0
18	I; 70-75; MBT	7 kg; Franco	2640	30	93	77,0	72,0
19	I; 75-80; MBT	12 kg; Veiling	726	30	69	57,0	-
20	I; 75-80; MBT	12 kg; Franco	1152	30	71	59,0	66,0

This table describes for each of the auction rounds the provided supply of the apple market: the number of the grower, the type, quality and service level of the Elstar apple, the total amount of demand, the sold products in terms of quantity, price and related to which demand round.

Supply Elstar			Sold		
Grower	Product	Amount	Quantity	Price	Demand
1	Elstar; I; 60-65; MBT	316	316	55,0	2
2	Elstar; I; 60-65; MBT	777	68	67,0	2
3	Elstar; I; 60-65; MBT	460			
4	Elstar; I; 60-65; MBT	763	324	62,0	3+4
1	Elstar; I; 65-70; TT	2547	2536	57,9	5+6
2	Elstar; I; 65-70; TT	748			
3	Elstar; I; 65-70; TT	1267	1267	50,0	5
4	Elstar; I; 65-70; TT	187	156	56,0	7
1	Elstar; I; 70-75; MBT	1843	1843	63,0	10+11
2	Elstar; I; 70-75; MBT	9820	5271	72,3	11+16+18
3	Elstar; I; 70-75; MBT	1188			
4	Elstar; I; 70-75; MBT	2073	1639	72,9	12+13
1	Elstar; I; 70-75; MBT	1324	1324	72,0	13
2	Elstar; I; 70-75; MBT	2230	2230	63,0	8
3	Elstar; I; 70-75; MBT	3564			
4	Elstar; I; 70-75; MBT	3564	1650	76,6	15+17
1	Elstar; I; 75-80; MBT	871			
2	Elstar; I; 75-80; MBT	1382	1152	66,0	20
3	Elstar; I; 75-80; MBT	1180			
4	Elstar; I; 75-80; MBT	3735			

This table describes for each of the auction rounds the demand of the pear market: the auction round, the specific product and variety of the Conference pear, the demanded services, the quantity in kilograms, the start and end price of the auction clock in cents, and the auction results of the traditional auction and the reverse auction in cents per kilogram product.

Demand Conference				Clock		Result	
Nr	Product	Service	Quant.	Start	End	Sales auction	Reverse auction
1	II; 55-65; TT	14 kg; Veiling	4536	43	152	126,0	70,8
2	II; 55-65; TT	12 kg; Franco	144	13	94	78,0	78,0
3	II; 55-65; TT	14 kg; Veiling	2995	62	143	119,0	91,0
4	II; 55-65; TT	12 kg; Franco	460	70	144	120,0	86,0
5	II; 65-75; TT	14 kg; Veiling	2304	117	184	153,0	118,9
6	II; 65-75; TT	14 kg; Franco	129	116	188	156,0	121,5
7	II; 65-75; TT	12 kg; Veiling	547	74	178	148,0	150,0
8	II; 65-75; TT	14 kg; Franco	115	47	166	138,0	NA
9	II; 65-75; MBT	12 kg; Veiling	4932	80	165	137,0	149,1
10	II; 65-75; MBT	14 kg; Franco	1512	90	177	147,0	173,0
11	II; 55-65; MBT	14 kg; Franco	3340	50	152	126,0	-
12	II; 55-65; MBT	12 kg; Veiling	158	83	155	129,0	125,0
13	II; 55-65; MBT	12 kg; Veiling	691	59	138	115,0	123,0
14	II; 55-65; TT	14 kg; Franco	4348	59	149	124,0	126,3
15	II; 45-55; TT	14 kg; Veiling	4276	11	76	63,0	-
16	I; 65-75; TT	12 kg; Franco	1152	119	206	171,0	123,8
17	I; 65-75; TT	14 kg; Veiling	273	111	186	155,0	115,0
18	I; 65-75; TT	12 kg; Franco	1027	102	190	158,0	120,1
19	I; 65-75; TT	14 kg; Veiling	168	109	195	162,0	115,0
20	I; 65-75; TT	14 kg; Franco	240	78	198	165,0	127,6

The next table describes for each of the auction rounds the provided supply of the pear market: the number of the grower, the type, quality and service level of the Conference pear apple, the total amount of demand, the sold products in terms of quantity, price and related to which demand round.

Supply Conference			Sold		
Grower	Product	Amount	Quantity	Price	Demand
1	Conference; II; 45-55; TT	48			
2	Conference; II; 45-55; TT	312			
3	Conference; II; 45-55; TT	480			
4	Conference; II; 45-55; TT	528			
1	Conference; II; 55-65; TT	3780	3780	70,0	1
2	Conference; II; 55-65; TT	288	288	120,0	14
3	Conference; II; 55-65; TT	1368	1368	91,0	3
4	Conference; II; 55-65; TT	1344	1344	130,0	14
1	Conference; II; 65-75; TT	1920	1920	119,0	5
2	Conference; II; 65-75; TT	108	108	118,0	5
3	Conference; II; 65-75; TT	456	456	129,3	5+6+7
4	Conference; II; 65-75; TT	96	96	121,0	6
1	Conference; II; 65-75; MBT	960	960	140,0	9
2	Conference; II; 65-75; MBT	1260	1260	159,3	9+10
3	Conference; II; 65-75; MBT	840	840	152,0	9
4	Conference; II; 65-75; MBT	2310	2310	151,0	9
1	Conference; II; 55-65; MBT	132			
2	Conference; II; 55-65; MBT	1440			
3	Conference; II; 55-65; MBT	1344	849	123,4	12+13
4	Conference; II; 55-65; MBT	576			
1	Conference; II; 55-65; TT	1428	1428	81,8	1+2+4+14
2	Conference; II; 55-65; TT	84	84	110,0	14
3	Conference; II; 55-65; TT	672	672	91,0	3
4	Conference; II; 55-65; TT	1440	1440	101,1	3+14
1	Conference; II; 45-55; TT	588			
2	Conference; II; 45-55; TT	372			
3	Conference; II; 45-55; TT	2124			
4	Conference; II; 45-55; TT	480			
1	Conference; I; 65-75; TT	960	764	119,3	17+18+19+20
2	Conference; I; 65-75; TT	896	896	120,0	18
3	Conference; I; 65-75; TT	240	240	123,0	16
4	Conference; I; 65-75; TT	960	960	124,1	16+20

Appendix 2

Experiment instructions.

You are asked to participate as a grower in a reverse auction. On your screen you will find information about your current supply of products and cost information with regard to that supply. Also general information of supply and demand for these products in the market is presented.

Before the auction starts one has to analyze for which price and quantity one would like to sell the products. Also important are the quality dimensions of the product. These are also specified. The objective for the grower is to maximize its profit given a specified production. The grower has to sell its complete inventory of products for the highest price. The total costs for each grower are calculated depending on inventory costs and individual cost prices. The unsold inventory will be valued on the very low industry prices of the product. Therefore the best strategy is to try to sell all of your products. Each grower can see its cost price and the industry price for each of the products on its screen.

The buyer specifies the demand in terms of type of products, quantity and service elements. These dimensions are presented to the bidders (growers). The determination of value of winner is done via a so-called reverse Dutch auction clock mechanism. The clock indicates the price one would like to pay for the product. The clock starts low and the price increases. The grower who stops the clock first is certain that he can fulfill the demand for the indicated price and can specify the quantity he would like to deliver. The clock then continues until the next grower bids and specifies the quantity of its supply. The clock will continue until the remainder of the lot is fulfilled. For each of the winning bids the specific grower can see on its screen how much you gained for selling this product. At the end of the auctions the total amount will be paid in cash to you. For participation in this auction-experiment five euro will be paid to you.

Are there any questions?

We will start to run tow trial auctions and learn how the system works.

Appendix 3

Hypothesis 1 Mann-Whitney Test

Ranks

	sales versus reverse	N	Mean Rank	Sum of Ranks
auction prices elstar	,00	16	18,66	298,50
	1,00	16	14,34	229,50
	Total	32		

Test Statistics[b]

	auction prices elstar
Mann-Whitney U	93,500
Wilcoxon W	229,500
Z	-1,303
Asymp. Sig. (2-tailed)	,193
Exact Sig. [2*(1-tailed Sig.)]	,196[a]

a. Not corrected for ties.

b. Grouping Variable: sales versus reverse

Hypothesis 2 Mann-Whitney Test

Ranks

	sales versus reverse	N	Mean Rank	Sum of Ranks
auction prices conference	,00	17	13,56	230,50
	1,00	17	21,44	364,50
	Total	34		

Test Statistics[b]

	auction prices conference
Mann-Whitney U	77,500
Wilcoxon W	230,500
Z	-2,309
Asymp. Sig. (2-tailed)	,021
Exact Sig. [2*(1-tailed Sig.)]	,020[a]

a. Not corrected for ties.

b. Grouping Variable: sales versus reverse

4

Diversification and Corporate Governance

Hendrikse, George W.J. and Oijen, Aswin A.C.J.

Summary

This article addresses the impact of governance structure on diversification behavior. Hypotheses are developed regarding the differences in diversification strategy of cooperatives and stock listed companies. These hypotheses are tested with a sample of 114 Dutch cooperatives and stock listed companies. The analysis shows that stock listed companies are more diversified than cooperatives, related as well as unrelated.

Key words: Governance structure, cooperatives, stock listed companies, diversification
JEL codes: D2, G3, L2

1 Introduction

One third of the world food production is governed by cooperatives (Pattison, 2000). This observation raises two questions. First, it is important to know whether or not the governance structure cooperative produces food in an efficient way. Second, it is interesting to know why not all food is produced in agricultural cooperatives.

This article provides an empirical start to addressing the first question by comparing the diversification behavior of agricultural cooperatives and stock listed companies. The coexistence of both governance structures in many industries provides several possibilities for such a comparison. The implications of the choice of governance structure for diversification strategy will be empirically investigated in three sectors (food, trade and financial services) in the Netherlands. Hendrikse (1998) presents evidence and an explanation for the coexistence of cooperatives and stock listed companies in most agricultural and horticultural sectors.

A governance structure specifies on the one hand who formally holds the decisions rights and on the other hand the way in which revenues and costs are distributed (Hansmann, 1996). Governance structures can be distinguished by the identity of the owner of the decision rights. The providers of capital, or shareholders, are the owners of the enterprise in a stock listed company. The input providers have the formal authority regarding decisions in a marketing cooperative, of which agricultural – and horticultural cooperatives are prominent examples. Employees have the formal authority regarding decisions in a labor-managed firm, whereas buyers have these rights in buying cooperatives.

Product diversification entails the entry of the company into new industries. A company is viewed as diversified when it is active in more than one industry at the same time (Pitts and Hopkins, 1982). Usually the distinction is made between related and unrelated diversification (Van Oijen, 1997). Related diversification entails the entry of a company into an industry that is related to the current activities of the company in its value chain (Porter, 1985). The similarities are usually in production, marketing or technology. Unrelated diversification, or conglomeration, entails the entry into an industry that has no significant relationship with current activities.

Lins en Servaes (1999) have shown empirically a relationship between the effect of diversification policy on the value of the company and the institutional structure of a country. The institutional structure of a country is measured by the concentration of property rights and the structure of industrial groups. They conclude that ‘evidence supports the no-

tion that differences in corporate governance matter' (p. 2237). Kamshad (1994) did not find an empirically significant difference between the diversification strategy of stock listed companies and labor managed firms in France. This article compares the diversification policy of marketing cooperatives and stock listed companies in the Netherlands.

The structure of this article is as follows. The next section formulates the hypotheses regarding the difference in diversification behavior of cooperatives and stock listed companies. The next two sections are dedicated to the methodology of our empirical work and the results of the empirical investigation. We close with a summary and conclusion.

2 Theory and hypotheses

Literature that directly links cooperatives to product diversification is not available. However, clues might be found in existing perspectives on diversification. Five perspectives that explain diversification can be distinguished (Hoskisson and Hitt, 1990; Montgomery, 1994). Each perspective is rooted in a different theory. According to the market power perspective, which is rooted in Industrial Organization, firms diversify because diversification enables them to exert market power through mechanisms like, for example, cross-subsidization and predatory pricing (Ramanujam and Varadarajan, 1989). The next perspective, which is based on agency theory, argues that firms diversify because their managers have personal motives to do so. Managers do not return free cash flows to the shareholders, but spend them on diversification projects, because of motives such as empire building, pay increases, and reduction of employment risk (Jensen, 1986). The third perspective is based on the strategic contingency theory (Venkatraman, 1989). Product diversification is then seen as a response to contingencies like antitrust law and disappointing results and uncertainty in the traditional activities of the firm. According to the next perspective, which is rooted in the resource-based view, firms can have excess resources (Penrose, 1959). The resources can be redeployed in new businesses, which implies diversification. Finally, firms diversify to achieve benefits, like economies of scope (Teece, 1982) and those of the internal capital market (Williamson, 1975), which are difficult to realize through market transactions because of high transaction costs.

The five main explanations regarding diversification provide only limited guidance with respect to the relationship between diversification and governance structure. Governance structure could, of course, be added as an additional contingency to the strategic contingency theory of Venkatraman (1989). This still entails, however, that a theory has to be

developed that explains how and why the different governance structures direct diversification strategy. This section provides an attempt at the formulation of such a theory.
The shareholders or the providers of equity can be considered as the owners of the enterprise in a stock listed company. They have the formal decision rights regarding new investments and the inputs that are used. The farmers decide about these issues in a marketing cooperative. This entails usually that each member of a marketing cooperative owns assets in, and therefore decides about, two stages of the production chain. The farmer decides individually about the investments at his farm and owns the farm assets. On top of that, all farmers collectively own the assets in the next stage of the production chain, which are dedicated to processing the harvest or produce of the farm. An agricultural or horticultural cooperative boils therefore down to forward integration of many farmers collectively in the processing stage of the production chain.

The difference between the governance structures of stock listed company and marketing cooperative is noticeable in many aspects of these organizations (Hendrikse and Bijman, 2002, and Hendrikse and Veerman, 1997, 2001a and 2001b). The members of a marketing cooperative are collectively the owner, take care of the financing of the cooperative, decide democratically and buy inputs from the members. The shareholders of a stock listed company are individual owners, they have provided the external equity, the decision making is autocratic and inputs are bought from the best provider of inputs.

A number of aspects of democratic decision-making will be addressed briefly. This is based on Hendrikse en Veerman (2001a). Democratic decision-making usually entails that it is tried to establish consensus in order foster optimal involvement of the members. This has advantages as well as disadvantages. It is attractive that different perspectives and experiences can be combined in the decision making process and makes it less sensitive to political activities, because bad proposals will not survive. An important disadvantage is the time consuming process of decision making and forming consensus regarding important policy shifts, especially when the relationship with the input activities of the marketing, and therefore with the core activities of the members, is hard to make.

The democratic decision making structure in marketing cooperatives is not only time consuming, but can also result in a tendency to avoid new initiatives. The reason is that new initiatives do not have the same consequences for all members. The lack of homogeneity between the members may prevent that unanimity between the members will be reached. New initiatives may also be frustrated by the way a marketing cooperative is financed. Takeovers cannot be financed by external equity. Equity has to be generated inter-

nally. This has its own problems due to the finite duration of membership. Earnings during the membership have to be at least as high as earnings elsewhere. This implies that the internal 'rate of return' on the assets of a cooperative has to be at least as high as in a stock-listed company when the average duration of the membership is shorter than the pay back period of the project creates problems. This is the well-known horizon problem (Bonin, Jones en Putterman, 1993). The increasing average age of the members in marketing cooperatives exacerbates this problem. Therefore, marketing cooperatives, which are mainly financed internally, will underinvest, compared with stock-listed companies when the claims of individual members are not transferable. This effect will be enhanced by the terms on which financial funds will be made available by third parties. The property of member domination in a marketing cooperative entails that the decision rights of external equity providers have to be bought. This is not done in a stock-listed company. The assignment of decision rights regarding investment projects to shareholders gives shareholders the confidence that their financial means will be spent well.

These differences between these governance structures marketing cooperative and stock-listed company indicate that marketing cooperatives will invest less than stock-listed companies, related as well as unrelated. These conclusions are formulated in the next two hypotheses:

Hypothesis 1: Stock listed companies are more diversified in related activities than marketing cooperatives.

Hypothesis 2: Stock-listed companies are more diversified in unrelated activities than marketing cooperatives.

Consensus decision-making in marketing cooperatives will be easier when the members are more homogeneous. Marketing cooperatives that are focusing on one activity, like milk, have homogeneous members. Diversification can undermine this homogeneity. A marketing cooperative that starts to sell vegetables in cans next to its dairy products has two different types of suppliers. The fair allocation of the revenues may be difficult. The relatedness between certain activities may make it desirable to bundle certain functions. For example, marketing and logistics can be combined to a certain extent in order to save costs. A simple allocation rule for the division of revenues, like the number of delivered liters of a certain quality, cannot be used anymore. Difficult negotiations between the dif-

ferent types of members will be the result. The addition of an unrelated activity, like the sale of insurance products, diminishes this problem. There will be less combined functions. Each activity has its own revenues, which can be relatively easy divided across the different types of members.

Related diversification causes fewer problems in stock-listed companies. The shareholders are homogeneous, in the sense that that they provide the same type of means. Profits can be shared according to the funds that have been provided. Another feature is that shareholders can diversify their risk easy by keeping a portfolio of stocks. The wealth of a member of a marketing cooperative is determined to a large extent by the well being of the marketing cooperative. Therefore, they benefit from a marketing cooperative investing in activities the returns of which hardly correlate, which entails spreading of risks. Unrelated diversification establishes this. Therefore, the expectation is that, in comparison with a stock listed company, a marketing cooperative diversifies relatively more in unrelated than related activities. This is summarized in our third hypothesis.

Hypothesis 3: Marketing cooperatives diversify relatively more in unrelated than related diversification than stock listed companies.

3 Methods

Data

The data were obtained from REACH (REview and Analysis of Companies in Holland). REACH is an electronic data source, which contains information of many Dutch companies. The information is predominantly financial. Important for our study is that the legal structure, the industry codes, and brief descriptions of the activities of each company are also provided.[8]

All cooperatives that were recorded in the 1996 edition of REACH were included in the sample. For each cooperative, we established the industry code of the main activity. This was based on the industry codes and the description of the activities of the cooperative included in REACH. Subsequently, we selected a matching corporation with the same main activity. This approach allowed us to control for industry effects. If more corporations were available, we selected one corporation randomly.

[8] The industry codes are based on the BIK system. BIK, which stands for *B*edrijfs*I*ndeling *K*amers van Koophandel (Company Classification Chambers of Commerce), is the Dutch equivalent of the American SIC.

The resulting sample contains 114 companies, of which 57 are cooperatives and 57 are corporations. The companies can be assigned to three sectors or broad categories of activities: agricultural and food (58 companies), financial services (34 companies), and wholesale and retail (16 companies). Besides, there is a small category of companies with other activities (6 companies).

MEASURES

Diversification strategy

To measure diversification strategy we used Wood's (1971) product-count measures. These neighed measures are less refined than, for example, the entropy measures (Jacquemin and Berry, 1979). However, they are easy to calculate and have lower information requirements (Lubatkin, Merchant, and Srinivasin, 1993). Specifically, they do not require a breakdown of a firm's total sales by activity codes. This kind of breakdown would not have been feasible in our study, because most of the companies in our sample do not disclose the necessary information. Moreover, Lubatkin et al. (1993) find a high degree of correspondence between Wood's product-count measures and Rumelt's (1974) categorical measure, which supports the validity of the product-count measures.

Wood (1971) distinguishes broad spectrum diversification (BSD) and narrow spectrum diversification (NSD). BSD is expansion, other than vertical integration, into an industry with different first two digits of the industry code. NSD is expansion, other than vertical integration, into an industry with a different four-digit industry code, but the same first two digits. BSD can be viewed as unrelated diversification, whereas NSD represents related diversification (Varadarajan and Ramanujam, 1987). We calculated both BSD and NSD, using the industry codes of each company according to REACH. To improve the distributional characteristics, we used the log of BSD and NSD in the analysis, thus obtaining the variables LOGBSD and LOGNSD.

In order to test our third hypothesis, we needed a variable that expresses the relation between related and unrelated diversification. We used a variant of MNSD, which was introduced by Varadarajan and Ramanujam (1987). MNSD, which stands for mean narrow spectrum diversification, is calculated as the number of four-digit industry codes divided by the number of two-digit industry codes of a company. In order to convey the relation between related and unrelated diversification, we replaced the numerator by NSD (our measure of related diversification). Again, we took the log of the outcome to get a better approximation of the normal distribution. The resulting variable is labeled LOGMNSD.

Legal structure

For a company's governance structure or legal structure we used the dichotomous variable LEGALS. LEGALS has a value of 0 for cooperatives, and a value of 1 for corporations.

Size

Controlling for size is quite common in diversification studies (Chatterjee and Wernerfelt, 1991). A positive correlation can be expected between size and diversification. Also, corporations may generally be larger than cooperatives. As indicated earlier, corporations face fewer restrictions with respect to the funding of expansion. They can finance expansion through the public offering of new shares in the stock market, whereas cooperatives are restricted to obtaining new equity from their members. If we would not control for size, then differences between the diversification strategies of corporations and cooperatives could be associated with size differences, instead of legal structure.

Usually, the total sales of a firm are taken as a proxy of size (Nayyar, 1993). We also choose total company sales. To obtain a more normal distribution, we used LOGSALES, the log of sales.

Statistical analysis

We used analysis of covariance (ANCOVA) to test the hypotheses. Three analyses were performed, one with LOGBSD as the dependent variable, one with LOGNSD as the dependent variable, and one with LOGMNSD as the dependent variable. In all three cases, the factor was LEGALS, and the covariate was LOGSALES. The inclusion of LOGSALES as a covariate is equivalent to testing whether the mean differences in diversification strategy are associated with the legal structure after adjusting for differences in size.

4 Results

Hypothesis 1 predicted that cooperatives would have less related diversification than corporations. Hypothesis 2 predicted the same, but then for unrelated diversification. According to hypothesis 3, the ratio of related to unrelated diversification is lower for cooperatives than it is for corporations.

Table 1 shows the results obtained when all three hypotheses are tested by comparing cooperatives to corporations, while controlling for size. We excluded one corporation from the analyses, because it proved to be an outlier with respect to both size and diversifi-

cation strategy. Table 1 also provides some descriptive statistics. It should be noted that the group means and standard deviations (in parentheses) are not based on the transformed variables LOGBSD, LOGNSD, and LOGMNSD, but on the original variables, since these are easier to interpret.

	LOGBSD		LOGNSD		LOG-MNSD	
	F	p	F	P	F	p
Factor for legal structure:						
LEGALS	19.08	0.00	8.90	0.00	0.04	0.84
Covariate for size:						
LOGSALES	0.08	0.77	13.81	0.00	9.06	0.00
Group mean (standard deviation)						
Cooperatives (N = 57)	1.28 (0.53)		1.81 (1.33)		1.44 (0.88)	
Corporations (N = 56)	1.91 (0.98)		2.79 (1.90)		1.87 (1.67)	

Table 1. ANCOVA results

The results indicate that size (LOGSALES) has a significant (positive) effect on related diversification (LOGNSD) and on the relation between related and unrelated diversification (LOGMNSD), but not on unrelated diversification (LOGBSD). The effect of the legal structure (LEGALS) is highly significant, on both related and unrelated diversification. The means show that, on average, corporations are active in 1.49 times as many unrelated industries as cooperatives are. The difference is slightly larger for related diversification. Corporations work in 1.54 times as many related industries as cooperatives do. Therefore, corporations turn out to be more diversified, both related and unrelated, than cooperatives. This supports our first two hypotheses.

We can add that the results are stable in all sectors. That is, in agricultural and food, financial services, wholesale and retail, and other activities, corporations are, on average, more diversified than cooperatives, both in a related and in an unrelated sense.
The means seem to support our third hypothesis. Cooperatives have a lower ratio of related to unrelated diversification than corporations. However, the difference is not statistically

significant. This pattern repeats itself in three out of four sectors. In financial services, the ratio is almost similar.

5 Conclusions and further research

This article has empirically investigated the relationship between governance structure and diversification. Hypotheses are developed regarding the difference in diversification behavior between marketing cooperatives and stock listed companies. Testing of these hypotheses was done with a cross section study of 114 Dutch cooperatives and stock listed companies. The results indicate that stock listed companies are more diversified than marketing cooperatives, related as well as unrelated. These results hold for each sector that we have investigated.

Our results indicate that the incorporation of the variable governance structure in diversification research seems to be a fruitful direction for further research. A few lines of research come up immediately. First, the relationship between related and unrelated diversification in each governance structure is not clear. The impression is that cooperatives diversify more in unrelated than related activities than stock listed companies. However, this difference could not be shown in a statistically significant way with the current sample.

Second, the above results do not necessarily imply that marketing cooperatives are less efficient or profitable than stock listed companies. We established that there is a significant difference between the diversification behavior of marketing cooperatives and stock listed companies, but the relationship with efficiency is less clear. The meta-study of Palich, Cardinal en Miller (2000) reports an inverted U relationship between diversification and profitability. The 'horizon problem' may imply that marketing cooperatives will use a higher return on investment for new activities or projects than stock listed companies. The diversification strategy of the marketing cooperative would therefore be more in the middle of the inverse U relationship than the stock listed company. However, the 'horizon problem' may also result in not adopting certain attractive activities because it will take a long time before these projects generate money. Besides, the marketing cooperative may also adopt projects that are less efficient, because the members take also farm considerations into account. The impression is that these latter effects dominate. The data to test these hypotheses is not available yet.

A third direction for further research is that the implicit assumption in the specification of the regression equations that the governance structure is the exogenous variable and the diversification strategy the endogenous variable. This is in line with the incomplete

contracting theory and transaction costs economics, where the choice of governance structure precedes the choice of investment projects. However, diversification policy may be determinative for the choice of governance structure. This would be in line with the result 'Form follows function' in evolutionary biology (Cosmides en Tooby, 1994) and the claim of Chandler (1962) 'structure follows strategy', although the latter claim has been formulated more with respect to the internal structure regarding divisions and functional departments than with respect to governance structure.

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5

Advances in Cooperative Theory since 1990: A Review of Agricultural Economics Literature

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Summary

This article reviews the advances in neoclassical, coalition-game theoretic, and new institutional-nexus of contracts applications of economic theory to agricultural cooperative literature published in English language academic journals since 1990. The article complements the Staatz framework developed to analyze the pre-1990 cooperative theory literature.

Key Words: Cooperatives, cooperative theory
JEL Codes: D2, G3, L2

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1 Introduction

This paper analyzes the post 1990 English language contributions of economists toward the advancement of economic theory addressing agricultural cooperatives. The paper reviews only theoretical — mainly deductive works. Thought pieces, empirical studies, non-agricultural theoretical/empirical papers are not included. Our efforts are partially guided by the framework utilized by Staatz in his 1989 review of the 1970's and 80's theoretical literature. Our objective is to assist the interested reader in gaining not only an understanding of the current work, but to place it in the context of a historical evolution. Articles reviewed in this paper were selected from the ABI-Inform database using the keyword "cooperative" and also from a list of indexed journals. See the Appendix for a list of journals searched.

2 Evolution of Cooperative Theory

Formal economic modeling of the farmer cooperative did not begin until the 1940s. In the first forty years of modeling, economists viewed the cooperative in one of three ways: a) as a form of vertical integration — often called the "extension of the farm" approach; b) as an independent firm — often named the "cooperative as a firm" view; and c) as a coalition of firms which act in a collective or collaboration manner — often called the "coalition" approach. Staatz (1989) reviews the first thirty years of these three distinct theoretical approaches in detail. He credits Emelianoff (1942), Robotka (1957), and Philips (1953) as the original formal modelers viewing the cooperatives as a form of vertical integration. They argued that the principle "service at cost" implied that only the members incurred profits or losses. Consequently each member determined his optimal level of output by equating the sum of the marginal costs in all plants (farm and cooperative) with the marginal revenue in the plant from which the product was marketed. The heroic Cournot-Nash assumption implied in the model has been the major criticism of this "multiplant firm modeling" approach. This approach analyzed only marketing cooperatives.

The cooperative as a firm approach drew heavily on Enke's (1945) work on consumer cooperatives. This analysis consequently was applied to input supply cooperatives. Enke's theory posited that the welfare of cooperative members and society was maximized if a cooperative maximized the sum of the cooperative's producer surplus and the members' consumer surplus. This approach needs a hierarchical decision maker or coordinator — similar to the role played by the CEO or general manager of an investor owned firm.

The major criticism of this approach was that it would not lead to a stable equilibrium. Helmberger and Hoos (1962) analyzing Enke's work converted the logic to explain marketing cooperatives' behavior. This work dominated much of the North American theoretical research during the 1960's and 70's. Based on the assumptions of known net revenue function, price taking, and zero surplus objective function, the Helmberger Hoos marketing "cooperative as a firm" suffered from the same equilibrium shortcomings.

The impracticality of the "equilibrium" assumptions led a group of researchers — mostly Europeans (Kaarlehto, Ohm, and Trifon) to introduce the issue of heterogeneity and its implications for cooperative behavior. Conflicts — whether temporal, spatial, intergenerational, or principal-agent — led to the conclusion that there existed coalitions within the cooperative and that bargaining was an integral part of collective action. The solutions to these conflicts and the consequent bargaining became known in the cooperative theoretical literature as the "coalition" approach.

By the 1980's new economic theories and decision models were emerging. The risk and decision-making differences in inter versus intra firm coordination were becoming more distinguished. New approaches such as agency theory, behavioral theories of the firm, transaction cost theory, contestable market theory, game theory, and property rights theory began to emerge. Staatz (1989) systematically reviews how these approaches contributed to the previous theoretical work.

The 1990's witnessed considerable output in the area of theoretical research on the economics of agricultural cooperatives. After reviewing abstracts of several hundred published articles, we chose to review 21 theoretical pieces. These 21 were chosen after eliminating all empirical research and "thought" pieces. In addition to the criteria stated in the introduction, we utilized subjective criteria such as non-duplication, additivity, issue importance, and clarity of arguments. The articles were categorized into three of the four9 categories identified by Staatz in his seminal review. This approach is not without criticism, but it appeared to minimize the overlap other typology and taxonomic approaches offered.

This paper extends Staatz's work and categorizes post 1990 theoretical research on agricultural cooperatives into three major streams of output: a) extensions of the "coopera-

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9 We eliminated the use of "Analyses of Cooperatives in the Planning Sector" because of scarcity of output in the searched journals.

tive as a firm"; b) the cooperative as a "coalition"; and c) the cooperative as a "nexus of contracts". The next sections expand on these three streams of output in greater detail.

3 Post 1990 Extensions of the "Cooperative as a Firm" Approach

During the 1990s, economists refined and reworked advances accomplished in the 1980s. The following articles present theoretical work built around the assumption that the cooperative as a separate firm seeks to maximize a single objective function.

Sexton (1990) uses neoclassical theory to develop a model of spatial competition in agricultural marketing industries. The model derives price-output equilibria for investor-oriented firms (IOF) and cooperative processors in oligopsonistic, spatial markets, focusing on the pro-competitive effects of cooperatives. Sexton computes and compares equilibrium processor-farm price spreads under alternative market structures and modes of firm behavior by means of the conjectural variations approach.

Previous models of marketing cooperatives examined the pricing behavior of cooperatives in isolation as if they were a monopsonistic processor (see surveys by LeVay, Sexton [1984] or Staatz). This literature failed to consider the spatial dimension of market structure in the analysis of firm conduct and performance. Sexton formally establishes the conditions and magnitude of the cooperative yardstick effect in oligopsonistic markets. He states that a cooperative, which follows net marginal revenue product (NMRP) pricing behavior, generates less competitive effects than an equivalent cooperative following net average revenue product (NARP) pricing behavior. The author elucidates the pro-competitive role of open membership cooperatives in such market structures. The extent to which a cooperative plays a yardstick role in oligopsonistic markets depends on its membership policy, pricing policy, and whether the cooperative operates in the upward or downward sloping portion of the NARP curve.

The paper has interesting and controversial public policy implications. Its findings support favorable public policy towards open-membership cooperatives but similar pro-competitive effects cannot be claimed for restricted membership cooperatives.

Feinerman and Falkovitz (1991) extend neoclassical theory to a situation in which both producer and consumer services are supplied by the cooperative and members' production decisions and consumption behavior are determined simultaneously. The producer services offered by the cooperative enter members' production function and affect members' productivity and net income. Members' net income, in turn, enters as an argument —

i.e., a composite private good — in their utility function in combination with the utility derived from the cooperative's consumer services. The goal of the cooperative — in this case, the moshav in Israel — is to maximize members' total welfare given by the representative member's utility function. In other words, the model assumes a homogeneous membership with identical utility and production functions.

The paper derives the necessary conditions for Pareto optimality by solving the members' utility maximization problem subject to constraints. The authors also derive the set of prices and taxes that induce the representative member to behave so as to achieve the optimal welfare solution. In other words, prices and taxes are decision variables to the cooperative. The cooperative chooses prices and taxes so as to induce the representative member to select Pareto optimal activity levels. In addition, the authors examine the optimal cooperative size (i.e., number of members) in the long run.

The results of this paper shed light on the internal operations of an agricultural multipurpose service cooperative. The analysis shows that the cooperative can establish a mode of operation (set of prices and taxes charged for its services) that induces members to behave in welfare optimal way. But the authors point out that the economic stability of the cooperative is not guaranteed when external conditions change and the cooperative cannot adjust accordingly. The paper also determines the optimal long run size of the cooperative when the "cooperative exactly covers its costs by collecting user charges and a lump sum tax that equals the land rent plus marginal congestion costs." In reaching these results, strong assumptions are utilized.

Choi and Feinerman (1993) extend Feinerman and Falkovitz's (1991) neoclassical analysis of the Israeli moshav by investigating the impact of membership heterogeneity on optimal pricing rules for cooperative services. In this model, the moshav has two groups of farmers producing different outputs. The moshav supplies its members with two inputs: a publicly provided private good (water) and a local public good (road services). Based on the theory of local public goods and club goods, the authors derive Pareto-optimal pricing rules for the moshav's inputs. The model assumes the cooperative chooses optimal pricing rules by maximizing the profits of one group (the incumbent group) subject to a constraint on the profit of the other group. The authors obtain the Pareto optimal pricing schemes under different conditions.

The paper sheds light into the operation of an agricultural multipurpose service cooperative with heterogeneous membership. In particular, the paper contributes to our understanding of how to set optimal pricing schemes for cooperative services under different

input allocation and membership policy conditions. Despite the authors' focus on the Israeli moshav, "the theory can be extended to producer cooperatives with more than two types of producers using multiple local public inputs and divisible and chargeable inputs" (p. 243).

Royer and Bhuyan (1995) offer a neoclassical analysis of the incentives for and impacts of forward integration into downstream processing stages in the marketing chain by both an IOF and an agricultural marketing cooperative. They develop a three-stage model of a vertical market structure consisting of farmers, an assembler and a processor, with two behavioral assumptions for the cooperative assembler: active versus passive cooperative. The active cooperative is able to control raw product supply (possibly by restricting membership), whereas the passive cooperative takes the quantity of raw product delivered by members as given. The authors compare equilibrium post-integration price-output solutions for the IOF and for the active and the passive cooperative. In doing so, the article complements and supports the Sexton (1990) results.

The authors discuss the economic incentives for forward integration by a cooperative assembler with an emphasis on market power incentives. More specifically, they argue that active cooperatives have an incentive to integrate forward into processing stages because vertical integration allows them to generate monopoly profits in processed product markets. Passive cooperatives, however, behave like a competitive firm and may not have a market power incentive to vertically integrate downstream in the marketing chain. Their market power interpretation of the incentives for cooperative vertical integration complements transaction cost and incomplete contracting approaches which are examined in a subsequent section.

Tennbakk (1995) utilizes standard industrial organization theory to study the performance of oligopolistic markets with three alternative structures: pure private duopoly, mixed duopoly with cooperative and mixed duopoly with public firm. The performance of alternative market structures is compared to the first best (perfect competition) solution. In doing so, the author contributes to the literature examining the pro-competitive effects of cooperatives in concentrated industries.

Tennbakk observes that the extant literature has focused on the justification for favorable public policy towards cooperatives, both in terms of ameliorating market inefficiencies and providing better terms of trade to producers. He compares agricultural cooperatives with public firms as alternative policy mechanisms both in terms of total welfare and distributional effects.

This paper contributes to the literature by focusing on an alternative public policy instrument to ameliorate market failures in concentrated markets. The results are not novel, neither is the model approach (Cournot competition in a duopoly). However, Tennbakk raises the issue of the cooperative not being a unique public policy instrument to achieve market efficiency. In fact, he concludes, that from a welfare maximizing point of view, nationalization is preferred to the mixed market structure with a cooperative.

Albaek and Schultz (1998) use standard industrial organization theory to develop a model of competition between a cooperative and an IOF in a Cournot duopoly setting. The authors derive conditions in which the cooperative will gain a very high market share and will drive the IOF out of the market. Previous models of the behavior of cooperative firms in oligopolistic markets have assumed that a cooperative maximizes the total profits of its members. Albaek and Schultz view the cooperative as a commitment device for pushing the reaction function of the cooperative outwards. The authors formalize this assumption and derive the resulting theory of market dominance of cooperatives over IOFs.

This article advances our understanding of why cooperatives have been so successful even though they have been in competition with profit-maximizing firms. The authors also show that the members of the cooperative will earn more than the vertically integrated profit per farmer generated in the IOF. However, the applicability of these results is limited by the strength of their assumptions.

4 Post 1990 Extensions of the "Cooperative as a Coalition" Approach

Significant advances were made in the 1990s whereby the modelers viewed the cooperative as a coalition of utility maximizing subgroups. This recognition and formalization of the heterogeneous makeup of a cooperative organization is an important contribution to the literature on group choice. Included in this section is a subset of papers utilizing the game theoretical framework. This approach analyzes situations in which there are gains from joint action by a potential coalition of members but where members must bargain among themselves about how benefits are to be distributed. Following is a review of a number of the coalition theory contributions.

Zusman (1992) uses contract theory to model the constitutional selection of collective-choice rules in a cooperative firm. The model explains how cooperatives design their bylaws and select their collective-choice rules under imperfect information, uncertainty, bounded rationality and bargaining cost economizing conditions. In game-theoretic terms, Zusman's model unfolds in two stages. The first is the 'constitutional phase,' while the lat-

ter is the 'operational phase.' Previous single-stage models of cooperative decision-making focused primarily on particular problems (e.g., pricing rules) and the corresponding inefficiencies. Instead, Zusman provides a more general framework that deals with selection of collective-choice rules, and thus can be applied to a number of situations. Furthermore, he models explicitly transaction cost and member risk premia minimization. Additionally, a major contribution of his model is that it formalizes Vitaliano's (1983) work on the cooperative as a "nexus of contracts" (see Section V).

This article advances our understanding of how cooperatives design their bylaws and select their collective-choice rules when facing groups of heterogeneous members. The choice of collective-choice rules is based on the joint minimization of transaction costs and individual members' risk premia, and depends upon the relative importance of the group-choice problem. The conceptual approach employed by Zusman is general in nature and flexible enough that it can be extended to other constitutional choice problems. Examples include the optimal membership size and the internal tax and cost-allocation rules.

Zusman and Rausser (1994) adopt a contracting approach in constructing a bargaining game among the various participants in a collective action organization. They view a collective action organization as an n+1 person bargaining game and derive a cooperative solution reflecting social power and influence of various interest groups. They apply the Nash-Harsanyi solution concept and suggest an influence equilibrium structure, which reflects the underlying bargaining power of the various organizational participants and determines all major group choices. The authors calculate the socially optimal level of the provision of a public good and compare it to the one provided through collective action. In their analysis they also incorporate the planning horizon of the central decision maker and calculate its impact on the attained efficiency.

Previous bargaining models of cooperative decision-making have viewed the cooperative as an all-channel network. Accordingly, these models portrayed collective decision-making as an n-person prisoner's dilemma, which leads to suboptimal decisions whenever the number of participants is large. Instead, Zusman and Rausser model the cooperative as a wheel network consisting of a center and various participants. By adopting this view, the authors transform the prisoner's dilemma into an n+1 person bargaining game played by the center and the n-peripheral participants where the bilateral relationship between the center and each of the other players is especially important. The authors also incorporate explicitly the horizon problem facing the central decision-maker of the collective action network, something that previous models failed to do.

This article advances our understanding of how organizational inefficiencies in cooperatives are generated through the influence activities of socially powerful groups of participants. Although under market failure collective action yields efficiency improvements over uncoordinated private action, an overall group optimum should not be expected. It should be noted that the externalization of social costs and benefits by narrowly-rational, self-interested, peripheral participants; the internalization of group goals by the center; and the social power of the peripheral participants over the center are crucial assumptions for this conclusion. The theory presented by Zusman and Rausser points out that the efficiency attained by collective action schemes crucially depends on the relative bargaining power of the various groups of members and the planning horizon of the central decision-maker.

This article has significant implications for the efficient design of collective action organizations in particular. It justifies the use of incentive structures for ameliorating the influence costs and horizon problems. However, the authors fail to justify some of their assumptions on grounds other than the simplicity of mathematical calculations (e.g., the peripheral participants planning horizon is assumed to be infinite, or they assumed to be identical).

Fulton and Vercammen (1995) use neoclassical theory to develop a model of non-uniform pricing schemes which, when adopted by a supply cooperative would mitigate the economic inefficiencies arising from average cost pricing. The authors derive the resulting stable equilibrium and the distributional effects of simple non-uniform pricing schemes when members are heterogeneous. Thus they are able to suggest under what conditions non-uniform pricing schemes should be adopted by cooperatives. Previous models of the pricing behavior of cooperatives have identified the inefficiencies arising from average cost pricing, but have failed to suggest alternative stable equilibria. For example, Sexton (1986) modeled the pricing behavior of cooperatives and identified pricing mechanisms that at the theoretical level would lead to a stable equilibrium, albeit difficult to implement. Fulton and Vercammen's results show that a relatively easy to adopt mechanism does exist. Furthermore, the authors move away from the usual objective attributed to cooperatives, namely the maximization of the sum of members' and cooperative profits. According to their formal model, the goal of the cooperative is to choose a contract schedule that satisfies four constraints (economic rationality, incentive compatibility, individual rationality, and equity/fairness).

This article advances our understanding of the impact of non-uniform pricing schemes in agricultural cooperatives. More specifically, it adds to our knowledge on how

non-uniform pricing schemes ameliorate the economic inefficiencies associated with uniform pricing methods. Furthermore, this work sheds light on how alternative equity/fairness mechanisms lead to various distributional results and provide reasonably easy to implement non-uniform pricing schemes in alternative settings. An example would be the pooling of revenues, which is a form of uniform pricing. The resulting average price can distort the decisions made by the farmer members. Non-uniform pricing offers an alternative to this pooling payment arrangement. However, the use of this alternative is likely to have distributional consequences that the cooperative should consider.

A number of strong assumptions are needed to generate their results, such as: a) side deals between members do not take place, otherwise the non-uniform pricing scheme is ineffective, and b) their use of median voter theory to model the choice of method for distributing profits to members.

Vercammen, Fulton, and Hyde (1996) use standard neoclassical theory to develop a model of nonlinear pricing in a marketing cooperative. They derive a pricing scheme for a constant-cost marketing cooperative that maximizes member surplus, allows the organization to cover fixed costs, and explicitly addresses the constraints of member heterogeneity and asymmetric information regarding the appropriate membership fee. Previous models of the pricing behavior of cooperatives have identified the constraints of member heterogeneity and asymmetric information regarding the appropriate membership fee, but have not dealt with them. Another constraint incorporated in this model is that no member is to be worse off with the proposed scheme than with standard cooperative (average-cost) pricing.

This article further advances our understanding of the impact of non-uniform pricing schemes in agricultural cooperatives. More specifically, it adds to our knowledge on how non-uniform pricing schemes ameliorate the economic inefficiencies associated with uniform pricing methods. However, the authors underemphasize the impact of alternative governance structures and voting methods on the adoption of a particular pricing scheme.

Albaek and Schultz (1997) use neoclassical microeconomic theory and voting theory to develop a stylized model of investment, in order to study investment decisions in agricultural marketing cooperatives. The authors derive voting and cost allocation rules under which agricultural marketing cooperatives tend to make efficient investment decisions. The article extends previous work on the voting behavior and cost sharing practices of cooperatives. Results suggest that the democratic voting of one-member/one-vote may not contradict efficiency and distort the investment decisions of marketing cooperatives.

This article advances our understanding of under what voting and cost sharing rules marketing cooperatives tend to make efficient decisions. When members' contributions to cover the cost of an investment are independent of production, whether the cooperative will invest efficiently depends on the adopted cost sharing rule, the voting rule, and the size distribution of farmers. According to their analysis, cost sharing according to "size" is the most efficient method, irrespective of the adopted voting rule. Financing an investment by retained earnings will lead to efficiency distortions, unless the investment is small relative to the cooperative's total revenue. The authors assume in their model constant returns to scale for the cooperative plant and thus do not account for the negative impact of no control over supply (free rider problem). They also fail to mention the horizon problem facing cooperative members, especially with respect to investments in intangible assets. Another assumption being made by the authors is that of rational farmers who know each other's cost functions and can easily figure out their best responses.

Hendrikse (1998) constructs a game-theoretic model of investment decisions in which the choice of organizational form (cooperative vs. IOF) is the key strategic variable. The game unfolds in three stages and is solved for its supergame perfect Nash equilibrium by the method of backward induction. Conditions are derived under which cooperatives become efficient organizational forms. Hendrikse also shows under what circumstances IOFs and cooperatives can coexist in a sustainable equilibrium. Finally, circumstances are identified in which competition results in a prisoner's dilemma faced by IOFs alone.

This article enriches previous models of decision-making in cooperatives, which have focused on the cooperative as a single entity or as a form of vertical integration, by perceiving organizations as collections of decision units. According to this point of view, a cooperative consists of two units with each having the power of veto, whereas an IOF consists of only one decision unit. Necessarily, the model abstracts from reality by not incorporating other, at least equally important, organizational aspects of cooperatives. Another innovative aspect, relative to previous work, is that it distinguishes cooperatives and IOFs with respect to the probability each organizational form has of accepting/rejecting good and bad projects. Finally, Hendrikse's model contributes to the economic theory of the cooperative firm by formally establishing the conditions under which favorable public policy toward cooperatives is desirable.

The author derives several hypotheses that may inform empirical research: a) a switch from a cooperative to an IOF does not occur when the attractiveness of an industry is reduced; b) an IOF accepts a larger percentage of projects than a cooperative. Conse-

quently, it is shown that an IOF has a relative advantage in accepting good projects, whereas the cooperative is preferred when the rejection of bad projects is more important; c) an increase in the difference between the acceptance probabilities of good projects of an IOF vs. a cooperative favors the choice of an IOF in both a monopoly and a duopoly market structure (the opposite is also true); d) an increase in the benefits associated with a good project, an improvement in the portfolio, and a decrease in the costs associated with a bad project increase the range of parameters for which an IOF is chosen, in a monopolistic market; e) in duopoly, a higher prize of winning the game (lower costs, improved portfolio) will increase the expected pay-off of a project and therefore increases the range of parameters for which an IOF is chosen; f) a duopoly consisting of two cooperatives is predicted for a larger set of parameter values than the choice of a cooperative by a duopolist; and g) two different organizational structures may coexist in equilibrium — an IOF is sustained in such equilibrium because it faces a higher expected revenue of good projects in either a monopoly or a duopoly, — a cooperative is sustained because of lower expected costs of accepting bad projects outweighs the reduction in the expected revenue of accepting a good project in either a monopoly or a duopoly.

This article advances our understanding of how the uniqueness of cooperatives, in terms of decision-making, may lead to an industry equilibrium in which cooperatives and IOFs coexist. Furthermore, the article derives conditions under which favorable public policy toward cooperatives is justified so that efficiency is improved upon. A limiting assumption in the model is that there is no conflict of interest between decision makers, i.e. all decision makers are assumed to maximize the same utility function.

Bourgeon and Chambers (1999) develop a two-stage game theoretical model of cooperative pricing under asymmetric information. They derive pricing rules for an agricultural marketing cooperative with heterogeneous members who differ by their cost efficiency and their bargaining power within the cooperative. In the first stage of the game, the cooperative induces farmers to produce their myopic output in order to generate potential monopoly rents. In the second stage, the cooperative must distribute the revenues realized to its members in a way that leads to a stable equilibrium. Previous models of cooperative pricing rules (e.g., Vercammen, Fulton, and Hyde 1996) have assumed a continuum of producers' types and a nondiscriminating management board. These models seem to suggest that the first-best solution is not attainable. This model extends previous work by assuming that farmers constitute different groups with asymmetric bargaining powers. Bourgeon and Chambers formally establish the conditions under which a nonlinear pricing

scheme may be implemented by offering two two-part schedules. If the first-best production levels are implementable, the optimal pricing rule can be implemented by a quantity-dependent, two-part pricing scheme or by a combination of nonlinear cost recovery and two-part pricing. The first-best will typically occur when the bargaining powers of the producer groups reflect their percentage of the total producer population. When their bargaining powers diverge from their proportional representation, the first-best may not be implementable. In those cases, the optimal cooperative pricing scheme also can be implemented by a combination of quantity-dependent, two-part pricing and nonlinear cost recovery.

This article advances our understanding of how a heterogeneous cooperative membership affects the efficiency attained by various alternative pricing schemes, under asymmetric information. The extent to which efficient pricing can be implemented depends crucially upon the relative bargaining power of the various member groups in the cooperative. The paper has important implications for the organizational design of agricultural marketing cooperatives. When the membership of a cooperative cannot be assumed to be homogeneous, organizational and governance structures that address the resulting inefficiencies should be adopted.

Fulton and Giannakas (2000) examine the issue of member commitment in the context of a mixed oligopoly where cooperatives and IOFs compete with each other in supplying a consumer good. They develop a two-stage game-theoretical model of price competition between a consumer cooperative and an IOF that provide the same product/service to consumers. Different scenarios concerning the objectives of the cooperative and the nature of the pricing competition are examined within this framework. All formulations of the game are solved using backward induction. The problem of consumers is considered first, followed by the derivation of the Nash equilibrium prices which, in turn, determine quantities, market shares, and the welfare of the groups involved. The authors provide a generalization of Cotterill's (1987) model of mixed oligopoly equilibrium. They also extend previous models by incorporating member commitment into their game and studying how it affects the basic model parameters in the computed Nash equilibrium.

This article advances our understanding of how member commitment affects prices, quantities, market shares, and the welfare of consumers in a mixed oligopoly where a cooperative and an IOF compete. The demand faced by the cooperative and the market share it commands in a Bertrand type of oligopolistic market not only depend on the price of the product but also on the degree of member commitment. When the cooperative's goal is the maximization of its members' surplus, its pricing strategy is independent of its rival's pric-

ing strategy. Cooperatives can maximize member surplus by maximizing their sales. However, when the cooperative maximizes its profits, its price and the IOF's price and quantity will increase, while the cooperative's sold quantity and consumer welfare will decrease.

Karantininis and Zago (2001) develop a game-theoretical model in order to study the effects of endogenous membership and heterogeneity on members' and cooperatives' behavior. An IOF and a cooperative compete in a Cournot-like fashion. The authors derive the conditions under which a farmer will join the cooperative in a mixed duopsony setting, the optimal membership size of the cooperative, and the impact of member heterogeneity on the optimal membership size. Previous models of cooperatives have primarily studied under what conditions there is a departure from efficient resource allocation and thus failed to model explicitly the possibility for outside opportunities to members. Also, previous models have typically assumed homogeneous members. Karantininis and Zago model explicitly the decision of farmers to join the cooperative versus the IOF, and the optimal membership size of the cooperative under an open and a closed membership structure. They also provide preliminary results regarding the tendency of inefficient producers to prefer the cooperative instead of the IOF. Hypotheses generated from their model include: a) when members of the cooperative adopt a decentralized decision-making behavior, with an open membership policy, the relative advantage of the cooperative vanishes and the optimal size is lower compared to a closed membership; b) total profits and quantity produced will be higher in a mixed duopsony (coop and IOF) than in a pure duopsony (two IOFs); c) in a mixed duopsony, the cooperative produces more than the IOF, but, at the individual level, farmers delivering to the cooperative produce less than those selling to the IOF; and d) when farmers are heterogeneous in terms of efficiency, the cooperative will tend to attract more inefficient producers.

The authors advance our understanding of how farmers choose between alternative marketing channels. They also provide insights into how farmer heterogeneity may affect the efficiency of cooperatives. Open membership cooperatives may have a disadvantage relative to closed membership ones. The decision of members to join a cooperative is primarily determined by the profits the cooperative can secure for its members. When farmers in an industry are characterized by diverse efficiency levels, the cooperative should provide incentives to the more efficient farmers, otherwise it will end up attracting only the less efficient.

Banerjee et al. (2001), by incorporating insights from New Institutional Economics, construct a theoretical model of rent-seeking within agricultural cooperatives. In their

model, inequality of asset ownership affects relative control rights of different groups of members (large vs. small). Under the assumptions of (i) constraints on lumpsum transfers from poorer to wealthier members, and (ii) disproportionate control rights wielded by wealthier members, the model predicts that increased heterogeneity of landholdings in the local area causes increased inefficiencies, by inducing a lower input price and lower level of installed plant capacity. The authors enrich previous models of decision-making in agricultural marketing cooperatives by explicitly and formally incorporating the efficiency implications of intra-cooperative bargaining power allocation, which results from restrictions on lumpsum transfers across different farmer groups. They also extend previous models by establishing conditions in which favorable public policy treatment of cooperatives is desirable. The article also contributes significantly to the empirical studies on cooperative decision-making and rent-seeking.

The authors derive several hypotheses that may inform empirical research: a) the product price selected by the cooperative is a function of the percentage of small farmers in its membership; b) rent extraction by large farmers is not an issue either when the cooperative contains no small growers, or when almost no large grower with any residual control right; c) if an increase in the relative number of small members does not increase their relative control rights at all, then the price selected by the cooperative must decline. In contrast, if their control rights increase faster than membership does, then the price must increase; and d) if control rights of small growers is smooth and strictly convex in their size, then the price function is U-shaped.

This article advances our understanding of how wealth constraints and heterogeneity of members distort efficiency in a spatial monopsonistic context, in a regulated industry. The authors show that the rent-seeking they identify in the cooperatives is a weaker form of the standard monopsony distortion, which suggests that an IOF in the same situation is likely to set lower prices and have lower productivity than these cooperatives. Also, where the distribution of land is unequal, the cooperatives may not function much better than a monopsony.

5 Post 1990 Extensions of the "Cooperative as a Nexus of Contracts" Approach

A third view gained substantial interest in the 1990's — that of positing the cooperative as a "nexus of contracts". This approach views business relationships among coop-

erative stakeholders as contractual relationships. The nexus of contracts approach is really a loose coordination of agency theoretical analysis, transaction cost economics, and property rights-incomplete contract theory. As the name suggests, their commonality is contractual in nature. Authors in the early 1990's produced numerous thought pieces positing a more complex framework than the more formal 1980's models but little new advanced theoretical work emerged. The 1990's also produced the beginning of interesting empirical work from a contractual point of view. But it wasn't until the end of the decade that more formal advances to the nexus of contracts work became evident. Five articles were selected to demonstrate this evolution.

Eilers and Hanf (1999) address the issue of optimality of contract design in agricultural cooperatives utilizing principal-agent theory. The authors provide an enlightening discussion of a major question in cooperative control and organizational design — who is the principal and who is the agent in an agricultural marketing cooperative. The paper explores and offers solutions in situations where the manager, acting as agent or principal, offers a contract to a farmer and where the farmer, acting as agent or principal, offers a contract to the cooperative. Positing strong utility function and risk preference assumptions, their results generate interesting hypotheses regarding which actor benefits most in which position and implications of alternative incentive terms.

The concepts of opportunistic behavior, conflicts of interest, asymmetric information and stochastic conditions are explicitly addressed in this paper. The authors' conclusions suggest that principal-agent approaches offer a useful tool in analyzing incentive problems in cooperatives. However, they warn that the researcher must have a thorough understanding of the unique organizational and institutional aspects of farmer cooperatives. It is the authors' deep understanding of those aspects demonstrated by their penetrating discussion of who really is the principal in an agricultural cooperative that makes this paper informative to the theoretical researcher.

Hendrikse and Veerman (2001a) use a property rights form of incomplete-contract theory to address an increasingly significant issue for agricultural marketing cooperatives — what governance structure most captures the benefits of member investment. The authors provide a succinct but clear introduction to incomplete contract theory and the resultant hold-up problems. The introduction is an excellent clarification of the importance of ex ante-ex post reasoning in the study of incomplete contracts. Additionally, the authors identify potential hold-up solutions for producers when transacting with marketing cooperatives and with investor owned firms.

Utilizing a three-stage, non-cooperative game theory approach, the paper informs the governance choice and investment decisions. The paper clearly defines the dual investment decision conflict for the producer when transacting with a marketing cooperative versus an IOF. The authors specifically address two of the most important hold-up issues in marketing cooperatives, the temporal asset specificity issue and the site and physical asset specificity hold-up situation. Their results suggest the latter is the most complex to solve. This paper contributes to our understanding of the recent emergence of new forms of producer governance structures, new capital formation programs, and new selective incentive regimes in producer owned marketing firms.

Hendrikse and Veerman (2001b) use another new institutional economics approach — transaction cost theory — to study the relationships between investment constraints and control constraints within an agricultural marketing cooperative. This article complements the (2001a) Hendrikse and Veerman article. A major contribution of this article is its clearly articulated description of transaction costs theory, governance structure concepts, and financial governance theory, and how they are related to agricultural cooperatives. The article also describes the control and investment decision differences between an IOF and a cooperative using a new institutional economics framework and vocabulary. Employing the transaction cost framework the authors develop a logical sequencing for members in deciding on the optimal form of governance structure subject to financial constraints. The paper analyzes the same two hold-up issues of temporal and physical site asset specificity and concludes that the first is easily solvable and the solution to the second set of hold-ups depends upon the degree of asset specificity and the degree of product heterogeneity.

This paper, along with the (2001a) paper, makes for an excellent primer on nexus of contract theory applied to agricultural marketing cooperatives. Both papers provide suggestions for more advanced theoretical work and empirical verification.

The Hendrikse and Bijman (2002) article expands on the Hendrikse and Veerman (2001a) work, addressing producer governance structure choices. The authors analyze the impact of ownership structure on investments in a multiple tier netchain utilizing a property rights-incomplete contract framework. The authors continue the quest to determine under what market and incentive structures is it beneficial for producers to integrate downstream through their own investment. Employing game theoretic models and analyzing scenarios with distribution of bargaining power as the variant, the authors generate first-best efficient ownership structures given alternate investment situations. Then using com-

parative statics with the incorporation of residual claim levels, optimal ownership structures are derived.

This paper provides a more detailed analysis of the complex decision making process when relatively specific investments generate opportunistic hold-up situations. The contribution of the incomplete contract approach to governance structure choices is evident. The cooperative as a "black box" firm continues to disappear with the advance of this theoretical work.

6 Observations

What have we gleaned from this exercise of reviewing cooperative theoretical literature? Following is a brief and incomplete listing of observations identified during this sifting and winnowing process.

OBSERVATION 1

The first observation is the rapid advance in the application of coalition and nexus of contracts approaches to understanding business collective action or, more specifically, agricultural cooperatives. The coalition literature emerged a bit earlier and is becoming a common approach to dealing with the increasing non-homogeneity of traditional collective action organizations. As cooperative problems are increasingly defined in bargaining, negotiation or agency terms, subgroup objective functions are observed. Consequently, the methodological approach deemed most appropriate was some form of game theoretical model. The number of theoretical nexus of contracts articles (and especially conceptual papers that were not reviewed because they were classified in the search as thought pieces) has been increasing at a very rapid rate, particularly since 1995. As the coalition and nexus of contracts approaches become more popular, we note that the public policy oriented extension of the firm analytics and its companion neoclassical theory appear to be increasing at a decreasing rate.

OBSERVATION 2

We note an increased uneasiness with the tradeoffs between formalism and realism. Over the period studied, we observe an increase in the number of more institutionally friendly theoretical developments, namely the coalition and nexus of contracts approaches. Cooperative researchers became increasingly interested in complex organizational issues

including heterogeneity of member interests, investment incentives and the design of decision-making rules. Interestingly enough, the degree of formalism – i.e., mathematical rigor – has not necessarily decreased. This might be a consequence of the fact that we used "percentage of economics" as one criterion to select articles to be included in the review.

OBSERVATION 3

The impact of heterogeneous stakeholder interests on organizational efficiency has been recognized as an important research topic. The formalization of membership heterogeneity was introduced in the 1980's with the advent of the coalition approach. Since 1990, all three analytical approaches have contributed to the understanding of the cooperative heterogeneity issue. Consequently, a plethora of suggested solutions to internal free rider, portfolio and influence costs constraints and other heterogeneity-related problems has appeared.

OBSERVATION 4

The post-1990 period is characterized by an increasing emphasis on research related to governance structures. Particularly, the rationale behind the choice of a cooperative governance structure among alternatives appears now more often in the literature. The emergence of transaction cost, incomplete contract, agency and game theoretic approaches have facilitated more in-depth analysis of the aforementioned topic.

OBSERVATION 5

There is an increasing recognition that management matters in the study of agricultural cooperatives. One of the major schools of thought in cooperative theory, the extended Emelianoff approach, did not recognize management or agents as important or even actual participants in cooperative organizational behavior. With advances in agency theory and their application to many of the behavioral and structural issues faced by cooperative organizations, the importance of the role of management – the traditional agent but not always as observed in the Eilers and Hanf article – becomes increasingly obvious. In all three of the theoretical approaches the behavior or existence of agents are modeled. Examination of their role generates renewed interest in the role of the principal and the consequent control and influence costs issues.

OBSERVATION 6

Following from the observation of the growing role of agency theory and the importance of the agent in cooperative decision-making and organizational behavior is recognition of the increasing role in the research agenda of the principal. The combined study of principal and agent and their interface in the development of constitutional guidelines and organizational decision-making is the general area of corporate governance. From Zusman's work on constitutional decisions to Hendrikse and coauthors on the organizational structure and decision-making, these papers increasingly begin to highlight the importance of corporate governance issues. This complex area, often addressed in anecdotal form and thought piece outlets, is surfacing as an increasingly interesting theoretical research area.

OBSERVATION 7

All three general approaches to conceptualizing and modeling agricultural cooperatives inform the issue of whether it is socially desirable public policy to permit or encourage collective action within the agri-food system. In particular, hypotheses were developed to inform under what conditions the cooperative might be considered the most efficient governance structure. More recent research output builds on the traditional competitive yardstick argument by suggesting potential contractual and organizational inefficiencies of the traditional cooperative structure. In doing so, it provides decision makers with tools to ameliorate hypothesized inefficiencies.

Summary

This brief review identifies twenty-one "important" economic theoretical articles analyzing agricultural cooperatives published since 1990. These twenty-one articles were selected from several hundred journal articles appearing in academic economic journals. The articles were classified by dominant theoretical approach into three distinct categories: firm extension, coalition, and nexus of contracts. We identified the theoretical approach utilized by the researcher, the theoretical contribution of the article, hypotheses generated, and applicability of the research output. The article concludes with seven general observations sifted and winnowed from the exercise by the authors during the reviewing process. The major observation was the shift in methodological approaches utilized by agricultural

cooperative theorists — from the more formal neoclassical models to the more behavioral assumption friendly contractual and coalition schools of economic thought.

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Appendix

LIST OF JOURNALS SEARCHED

Agribusiness: An International Journal

Agricultural and Resource Economics Review

Agricultural Economics

Agricultural Finance Review

American Economic Review

American Journal of Agricultural Economics

Annals of Public and Cooperative Economics

Canadian Journal of Agricultural Economics

Economic Letters

European Review of Agricultural Economics

Finnish Journal of Business Economics

Industrial and Corporate Change

International Food and Agribusiness Management Review

Journal of Agribusiness

Journal of Agricultural and Applied Economics

Journal of Agricultural and Resource Economics (Western J. of Agricultural Economics)

Journal of Agricultural Economics

Journal of Chain and Network Science

Journal of Comparative Economics

Journal of Cooperatives

Journal of Economic Behavior and Organization

Journal of Economic Literature

Journal of Economic Perspectives

Journal of Food Distribution Research

Journal of Institutional and Theoretical Economics

Journal of Political Economy

Oxford Review of Economic Policy

Quarterly Journal of Economics

Review of Agricultural Economics

Scandinavian Journal of Economics

6

On the Future of Cooperatives: Taking Stock, Looking Ahead

George W.J. Hendrikse and Cees P. Veerman

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.

1 Introduction

Cooperatives 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 cooperatives is impressive. From the well-known, early Rochdale pioneers towards our time, a great number of cooperatives or forms of cooperatives can be perceived.[10] Interesting is though the fact that cooperatives 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 cooperatives are dominant. Patisson (2000) claims that one third of world food production passes through cooperatives. 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 cooperatives nowadays behave sometimes like ordinary enterprises. The difference between, for instance, a stock listed company like Numico and a cooperative 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 cooperative versus the conventional firm is analyzed in Hendrikse and Veerman (2001) from a governance perspective. The marketing cooperative (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 cooperatives in terms of decision rights.

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[10] The history of cooperatives does not start with Rochdale. Historians go back to ancient times (McBride, 1986).

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 cooperatives is organized as follows. Section 2 takes stock of the impact of cooperatives. 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.

2 Taking Stock

Cooperatives, 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 cooperatives. Traditionally there are a number of reasons why cooperatives 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 cooperatives. 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 cooperatives 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 cooperatives was relatively stable too. Strategy was clear, member's interests homogeneous and evident. Discussions concentrated on ques-

tions of realized revenues for he members in view of those of the private enterprises and colleague cooperatives.

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, cooperatives found their world changing fundamentally. We will in short sum up the most important changes and analyse what this did to the cooperatives and their strategic answers. First of all the reaction of cooperatives 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 cooperatives, 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 cooperative? How to choose between the interests of the cooperative 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 have 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 cooperatives 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 cooperative 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

sumers, 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 cooperatives.

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 cooperative namely: trust. In a sense a cooperative is well-organised trust.[11] If the cooperatives expand and become more complex, then the heterogeneity increases. This is the threat to trust, because conflicting interests are introduced in the membership.[12]

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 cooperatives 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 kinds of demands one needs to have a virtuous and not only a valid enterprise.

In conclusion it can be stated that the challenges for cooperatives are fundamental and numerous. Cooperatives 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 cooperatives financially, and so on. Some of these questions will be addressed with the help of some theory in the next sections.

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

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

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)

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 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 cooperative is member control over the infrastructure at the downstream stage. Formal ownership over the downstream assets is the essential feature of a cooperative. 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 cooperative, 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 author-

ity (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 cooperative 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 cooperative enterprise in order to have access to the cooperative 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 cooperative 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.

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.13 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,

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13 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.

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 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.

Communication

'Professional management' in cooperatives 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 cooperative. Having members with their farming background and formal authority, and professional management with their final product market orientation and real control, in a 'new' cooperative 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 cooperatives. 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 cooperative, where the prominence of the farmers / members in indicated in bold.

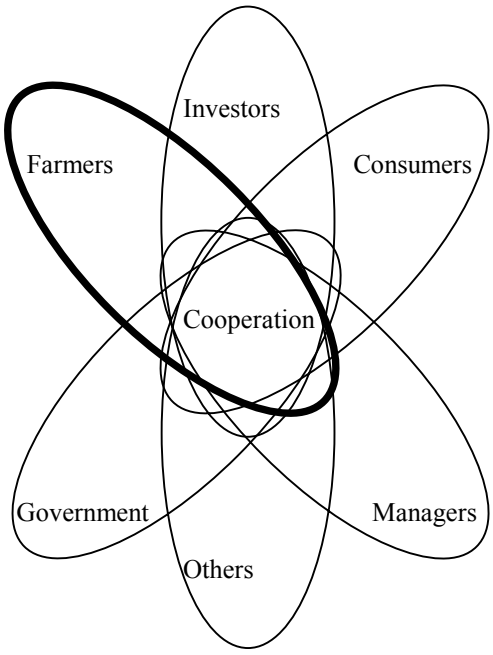

Figure 1: Intersecting provinces of meaning in an agricultural cooperative

One way to facilitate the communication between the members and the professional management is to appoint a cooperative board consisting of representative members. It has the important role of taking care of the communication between the members and the profes-

sional 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-cooperatives have often problems with this because their members are cooperatives, which creates too much distance with the farmers. Communication is an essential activity in cooperatives, especially because members' interests are more and more diverse (section 2). In addition to this, a cooperative 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.

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 cooperatives in order to discover the professional management's eventual deceitful or incompetent behavior in an early stage.

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 cooperatives is that decision rights are not considered that important during times when the cooperative 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.14 The cooperative 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 cooperative 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

14 Other implications can be formulated regarding the change in the membership of the cooperative (Fershtman, 1996), and the speed of organizational change (Hendrikse, 2000).

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 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 cooperative with frequent meetings of the General Assembly, will not consider the cooperative 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 cooperatives have to restructure themselves in order to take advantage of the opportunities provided by the new agricultural and horticultural markets. The restructuring of cooperatives 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 cooperative enterprise have to be made in order to result in cooperatives 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. Cooperatives may even emerge in other sectors, like environmental cooperatives. We hope that this article contributes to the restructuring and design of cooperatives.

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7

Commons, Collectives and Corporations, The Development and Change in China's Rural Sector

Barbara Krug

Abstract

China's rural sector responded to the policy changes as initiated by the Reform governments since 1978 with searching for and experimenting with different organisational forms. At the beginning all local assets were pooled and governed as a "common", at a later stage industrial and agricultural resources were separated. While the driving force behind changes in the organisational form was to harden private property rights, to enlarge the opportunity set for independent firms and to broaden the resource base, agriculture got stuck with the introduction of the land lease system. Decline in both productivity and agrarian income did not unleash innovativeness and institutional entrepreneurship. To the contrary: on one side we observe a partial revival of the socialist form of collectives since the late nineties, on the other the attempt to establish and control marketing and distribution by establishing its own food or raw-material processing firms. The variety of organisational solutions for securing reliable input and output markets, however, reflect more political decisions at the local [and national] level than choice by independent economic actors. The changes in both the agricultural and industrial sector in China's villages point to a deficit in conventional Transaction Cost Economics, namely the transaction cost driven attempt to better align governance structures with the economic environment. The paper offers a first attempt to fill the gap by using the data from China's rural sector.

Introduction: China's economic transformation and institutional change

China's remarkable economic transformation reflects institutional change rather than changes in relative prices, productivity, or changes in the composition of the capital stock. As in all other cases of transition economies the direction and form of transition depends on the institutional frame at the beginning of the reforms, namely a socialist planned economy. On the aggregate level the inherited institutional frame constitutes constraints for the emerging private sector on whose quick expansion the transformation of the economy depends. On the individual level, i.e. for entrepreneurs and firms, the inherited frame translates into transaction costs for any private transaction (Krug 1996, 1997a, 2000; Nee 2000; Nee & Matthews 1996; Oi & Walder 1999; Qian 2000). The following features of the Chinese economy can be singled out of specifying the types of transaction costs private economic agents had (and partly still have) to reckon with.

Non-existing private property rights. The reforms introduced the rights to control assets, such as land, but now private ownership. Even in the case of possessory rights, when private households could lease land or other assets, these rights did rarely guarantee that the possessor, such as the lessee, could legally exclude others from using the same asset. Nor did the right automatically secure claim to residual profit.

High information cost. In the case of China, high information costs do not reflect a high illiteracy rate or geographical dispersed market or major language problems, merely. They are the remains of the Communist Party's monopoly over all information channels that would facilitate a horizontal flow of information. Moreover, political censorship and the subsequent inevitable market for rumours, generate additional costs in form of the need to carefully scrutinize the sources of information in order to assess the factual content. Segregated markets. In the case of China, market segregation reflects the politically designed delineation of the national market into different regions with different guidelines for taxation, regulation, internal tariffs, and administration. Another form of segregation followed the organization principles within the socialist sector, where different sectors and firms were subordinate to ministries and/or bureaus rarely interacting, let alone cooperating with each other.

Co-existence of a socialist and a market sector. The spread of market exchange in China is accompanied but not necessarily caused by changes in legislation, such as introduction of flexible prices, the Company Law by which firms became legal persons, the Contract Law or regulations that forced state agencies to "privatise" assets. It is worth em-

phasizing that the general principals were not applied to all sectors of the economy, and not in all provinces at the same time. The effect is that one firm in one location or segment of the market could work under competitive conditions while fully responsible for profit or loss, while another firm producing the same product but located somewhere else or still part of the state sector functions under bureaucratic regime of the socialist economy. Moreover, when or where another round of liberalization would start is hard to predict, while those with insider-information, i.e. being close to the political leadership responsible for formulating and executing the reforms could reap high gains.

Low capital formation in private hands. Socialist planning methods left individual actors with little more than "working capital", or cash income necessary to buy the political defined quota state controlled goods. Thus, private savings or intra-firm capital accumulations were close to nil to the effect that any investment would have to be financed out of current income.

Liability of newness[15], which can be summarized as follows: First, there is no routine of business practice upon which an economic agent can rely. The changes in society at large, which accompany the transition process, make it hard to locate expertise, agents or procedures, which can be imitated or copied. Neither can expertise be bought or learned with the help of formal or informal education. In short: It is the newness of an organizational form that poses the challenge for entrepreneurs. Second, there is no "template" for success or failure as there is no collective memory about what may go wrong, and no past experience on which to rely. Third, there is no general knowledge about (excess) demand, price- or income elasticity of demand, let alone systematic research that would help entrepreneurs or industries to calculate the risk of this venture.

These systematic features translate into the following transaction costs:
High cost for protecting private assets and enforcing business agreements;
High share of non-transferable input co-ordinated by state agencies;
Asymmetric information;

[15] The term is by Stinchcombe (1965) and plays a major role in organisational ecology to analysis mortality rates of firms or other organisations. See sec. 4, and Hannan & Freeman 1998, for China Krug & Polos 2003).

Price differentials between markets and sectors;
High uncertainty;
High morality rates for new firms.

Transaction costs economics (TCE) on which what follows is based, is not limited to claiming that transaction costs limit private exchange and investment in scope and scale. TCE also claims that the search for transaction cost saving devices leads to institutional change in form of choosing between governance structures for different transactions (Williamson 1985).

As the theory in the Williamson-version assumes, economic agents will choose one of the following governance structures according to the specific features of transactions, and according to the behavioural assumption of opportunism, or the need to minimize transaction costs: hierarchy, market public regulation, public bureau, or hybrids (Williamson 1991, Krug 2002; Powell 1990). This typology of alternative governance structure does not help, however, to explain Chinese reality. Taking a bird's eye view (and in the long run) we do indeed, observe a switch from hierarchy [i.e. the planned economy], a to market economy where an increasing share of transactions is co-ordinated by prices and based on voluntary exchange. Yet, at the micro level, focussing on firms and industries, we observe the emergence of different governance structures that would all fall within the Williamson category of "hybrids", and for that reason escape the TCE-type of analysis as described above. Despite the mushrooming literature on hybrids within the management literature, such for example on networks, franchising or alliances, the findings cannot directly be used for analysing the new organisations around production in the Chinese countryside, as the later move in the specific environment described above. For this reason the analysis must start with a description of the organisational form of production before the analytical tool kit of TCE can be employed (Menard 2002).

The economic development in the Chinese countryside where an unprecedented wave of entrepreneurship became the locomotive of growth ever since the 80s[16] is a good example for changes in governance structures that escape the Williamson typology. The beginning of private production and exchange started when land tenancy (the so-called

[16] This, as all other references to years, has to be seen as general guidelines only. The implementation of laws and guidelines differed widely across China's provinces, or even within provinces.

household responsibility system) in which the village acts as the sole owner of land, while private household as lessees acquired control rights over land, was re-introduced. Subsequently, farm production diversified, productivity increased. After 1984 villages used the same lease system in order to find managers [as lessees] for local industrial assets. By this move it was expected to generate workplaces outside farming to "upgrade" production techniques and to secure tax revenues by broadening the tax base. These so-called township and village enterprises (TVE's) remaining in collective ownership posed a conceptual and empirical puzzle for the experts as well as for the Chinese authorities. One question was why the emergence of firms at the local level was not accompanied by private investment? Another questions was why a collective firm that had in the past rarely had been profit making enough to expand or invest in new machinery, "all at sudden" should have turned efficient if not profitable enough to generate workplaces, tax revenues and export earnings[17].

Starting around 1990, these TVE's organisational form as a collective gave way to another hybrid, the so-called "Shareholding Cooperation Enterprise" (SCE)[18] which to this day remains the dominant form of non-agricultural firms in the countryside. The point to note here is that this organizational change (Yep 2001)

Preceded any attempt of the Central Government to further privatise or restructure TVEs;

Deviates from the governance structure of shareholding corporations as implemented in urban areas, let alone Western-style corporations;

Is an attempt to maintain and safeguard collective ownership by searching for a more efficient organizational form, and

Has ended in the occupation of a "niche" which despite the merger wave at the end of the nineties has so far shown strong resilience to both: competitive forces in the market and political pressure from above.

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[17] China knows 44,741 townships, which on average have a population of 20,000 residing among 20 villages [Li 2002]. The share of TVEs on total export rose from 10.9 per cent in 1987 to 44.4 in 1993, and never dropped gain below one third. See Jeffrey and Woo 1997. A more comprehensive view can be found in Walder 1994; Putterman 1995; Oi & Walder 1995; Smyth 1997; Krug 1997b, 2000; Nee & Strong 1998.

[18] To be precise "gufen hezuozhi qiye".

As said before, these three organizational forms of private production and exchange- tenancy, collectives and corporations- escape the TCE-typology, whose comparative static character does also not allow analysing the move from one form to the other. Yet, in order to get a better understanding for economic transition in general, and the form transition takes in China's countryside, what is needed is to better explain the mechanisms and processes behind institutional change usually defined the expected switch from a planned economy to a market economy.

The following offers an attempt to fill the gap by describing the underlying switch from one organisational form to another. The paper proceeds as follows. Section 2 introduces institutions, which were re-employed after the reforms allowed individual actors and the villagers some extent of "institutional choice" at the local level. The analysis shows that these institutions were not new, but had been known in pre-Reform China, sometimes even for centuries. The usufruct principle, crop sharing contracts, and the reliance on a natural, i.e. uncontested, owner in form of the village, do indeed offer transaction costs advantages, in a situation where initial rights for resources need to be established and allocated. Sec. 3 summarizes the difference between the three organizational forms that had been "on the menu" when governance structures needed to be chosen for the new industrial firms, namely the family business, the collective and corporations. While the comparison between the three different forms makes use of the toolkit of TCE, Sec. 4 offers some preliminary conclusions how this different forms of firms fit in TCE and a further proceeding research agenda, namely organisational ecology.

2 The Chinese solution: Establishing collective property rights and reallocating assets

In clear contrast to the European cases where reforms started at the central government level and the intention to sell off [state] assets, the Chinese transfer of wealth started at the end of the seventies when villages began to contract out land. By doing so the villages preceded and pre-empted national policy which had not yet addressed the issue at that time. Despite vast regional differences, three common features can be singled out. First, the village was regarded as the legitimate owner of land and other assets within its boundary. Second, as the sole owner, the villages decided to lease the land rather than give it back to the families, which could claim ownership before the 1953 land reform [as for example Germany did in the nineties]. The other alternative, to establish a market for farm-

land was not even discussed[19]. Third, a specific kind of contract was used, one that had been the backbone of land tenancy for centuries, but was now also used for allocating control rights over industrial assets, namely crop sharing contracts. The economic analysis of these three aspects will be dealt with presently, before that three alternative governance structures for establishing firms that emerged in the Chinese situation will be described.

A The Usufruct, Crop-sharing, and the Village

It would be misleading to frame the privatisation process as one in which the (former socialist) state owns assets and looks for appropriate techniques for the transfer in a situation of low private savings and missing capital markets. Instead, the general problem is how to assign initial rights when the natural endowment forms a "public domain", i.e. where assets are dispersed in a territory defined by national boundaries, but in which property rights do not exist. In such a situation property rights might emerge based on (Posner 1980)

Usurpation, i.e. grabbing resources by force, where force might refer to political power or to the use of violence;

Inheritance, i.e. the claim that an ancestor in the more or less distant past had possessed the recourse;

Occupancy, i.e. the claim that those who, in the past, had contributed to the use and maintenance of the resources are the natural owners. This is called the usus fructus principle.

In China the usus fructus principle was employed when the initial right to the land was transferred to the natural owner. The initial right referred to the right to act as owner in the sense of being entitled to exclude other people from using the same resources. The consensus on the natural owners depends on a silent vote, more precisely, shared views or custom. In China, it turned out that not only private households, but also the rural cadres and even the national government agreed to the idea that the village is the natural owner of arable land. Taking into account that farming in China always depended on rural infrastructure, i.e. water irrigation, organized by the village, this view does not come as a surprise. The village itself used the same principle for assigning lease contracts. Those families, which under the socialist production brigade system had worked on a plot before the Re-

[19] For good reason. It is hard to see farmland catching a positive price when, thanks to the socialist income policy, private savings were unknown.

forms, were regarded as natural tenants, and therefore as the initial lessees. What is unique in China when compared to other transition economies is that the village was also accepted as natural owner of industrial assets. All firms that were not directly subordinate to ministries responsible for industrial sectors became the property of the whole village.
The second basic institution employed for privatisation was the crop-sharing contract known in China since the Tang dynasty [618-906 A.D. Twitchett 1979, pp. 19-28 and Kang 1986]. The functioning of crop-sharing arrangements is too well known to need to be recalled here [Cheung 1969a, Stiglitz 1974]. It should be noticed that by employing crop-sharing arrangements private contracting got re-introduced in the Chinese economy replacing [socialist] rule compliance as within the inherited production brigade system. The village used crop-sharing arrangements not only for contracting out land, but also for leasing out non-farm assets to a manager who than was entitled to control village firms.

In the case of the crop-sharing arrangement the transaction cost advantage in not hard to see: First, crop sharing offers a high premium for those who are willing to take the (entrepreneurial) risk[20]. Second, crop sharing helps overcome the shortage of capital. Instead of having to turn to the nascent capital market, or to the official sector in which access to capital was denied to any form of private entrepreneurship till the end of the nineties, an individual "entrepreneur" in rural China did not need capital in order to get control over inputs necessary for starting a company. Instead s/he could lease the available stock of capital. Third, the negotiated sharing parameter of residual income allows risk sharing, while simultaneously offering strong incentives to innovate. Thus, villages not having much confidence in individual undertakings would ask for a fixed fee as a lease, or a very low share on residual income that they feared might be negative. The lessee would then take most of the risk, but could also appropriate almost all of residual income. When, as often enough happened, the firm became successful and consequently the lessee's income increased drastically, the village's small share [or fixed fee] translated into marginal increases in revenue only. When subsequently the villages wanted to re-negotiate the initial contract, asking for a higher share on residual income or cash flow the managers were in such strong bargaining position that they by incorporating the firm would convert their lease income into share of a new incorporated firm [Yep 2003]. It is worth mentioning that

[20] The General Secretary of the Communist Party in 1987, Zhao Ziyang, insisted that "manager's income should include in part a compensation for risk" Renmin Ribao Nov. 4th, 1987; Hsu 1991.

these rural lessees constitute a major group among China's "Nouveau Riches" [Goodman 1994].

The custom, which re-instituted the village as the natural owner, must not automatically imply that agriculture and industrial production gets more efficiently organised or that private exchange is stipulated. After all the villages had been in charge in most of the Maoist era with the known dismal result that caused the political leadership to search other ways to run the economy in 1978. Property rights analysis claims that making the village the natural owner is advantageous only if the village budget (and the leadership's personal income) is directly linked to an efficient use of the stock of resources. This is, indeed, the case since China's fiscal reform of 1982 [Krug 1992; World Bank 1990; Wong 1992; Gong and Chen 1994]. The reforms put an end to the policy that villages could solve their budget problems by shifting locally generated deficits back to higher levels of administration. The constitution also made it the villages' sole responsibility to create workplaces in the countryside. Instead local expenses need to be alimented by local revenues. In this situation of a hardened budget constraint both local revenue and personal income or personal reputation (for being a competent village leader and such eligible for promotion) depend on efficient use of the villages' resources, and the cultivation of alternative revenue sources outside farming.

So far the advantage of the villages as the collective agent for allocating resources and searching for efficient employment can be seen in the following feature. The village allows pooling risk, information, and resources. Proximity creates information impactedness which helps to appoint the best available talent as manager of the village's firms or to detect the most competent tenant for specific agricultural sideline production, such as silk worm breeding, or tendering fish ponds or the quickly very profitable vegetable gardens. Village-based crop sharing contracts offer insurance via risk sharing among all agents, i.e. the village leadership and the lessees of the common stock of resources[21]. Instead, the village functions as a transaction cost saving device.

The advantage of village co-ordinated private exchange does not stop here. The village also provides a public good crucial for the beginning of private exchange, namely contractual security. As long as national legislation and law enforcement is poor, or miss-

[21] As is known from the literature, in cases in which the agents know more about the prospects of a firm than the principals, such contracts mitigate the problem of asymmetric information, Varian 1990.

ing, the village by stipulating regulations and offering effective enforcement, works as a powerful surrogate to court ordering. The villages established special committees that enforce written and unwritten contracts between producers and firms. By doing so they fill a gap in a situation in which national legislation in from Commercial Law is missing or not enforced (or not trusted) while market discipline (changing business partners) is not yet functioning.

Local jurisdiction renders the following advantages for individual actors staying within the village: Scrutiny costs for finding honest partners are comparatively low. Subsequently, the pooling of assets and risk is also co-ordinated at low costs. Not to be underestimated is that the village allows borrowing against one's own prospects. No collateral is needed for borrowing, thus permitting access to capital at low costs. The reason for this is once more information impactedness and the village's ability to use social sanctions in case of moral hazard.

All in all, assigning the initial rights to the village resulted in two effects in China. First, without much delay, a search process toward efficient use of resources was initiated. Second, it triggered off further institutional change by making use of crop-sharing contracts in a situation when the selling off of assets was severely limited by lack of capital and state guaranteed property rights. Third, the village provides the "public" good, namely "contractual security", i.e. a good that is neither provided by the market or by national legislation. Fourth, villages are small enough that information impactedness keeps moral hazard low and helps to select competent to whom control rights over assets are transferred. They work as Commons in the Ostrom sense [Ostrom 1990: 15-21].

B THE EXTENDED FAMILY, THE TVES AND CORPORATIONS

It was generally assumed by experts and Overseas Chinese alike that the Chinese family would form the backbone for entrepreneurship and the new private sector in Reform China. After all, the family is a crucial institution within the Chinese private sector outside China. Moreover, the economics of the family has shown that (extended) families generate considerable transaction costs advantages in an environment of ill-functioning capital markets [Brook, 1990; Bruun 1993; Carney 1998; Chan 1982; Gimeno et.al. 1997; Krug and Frey. 1987; Lever- Tracy 1996; Pistrui et.al. 2001; Wong, S.L. 1985].

First, it is a risk-mitigating institution [Rosenzweig 1988; Rosenzweig and Stark 1989]. It allows diversifying income sources by taking in family members of, or educating the young for, different professions. It allows spreading risk geographically by either marrying out children or by offering entry to family members living apart. It allows spreading risk over time as, unlike in European law, obligations do not end with death. Instead, family members are bound to honour the obligations of the deceased. It offers, finally, contractual security since the family has ample ways to retaliate. Cheating a kinsman can come close to commercial suicide as it implies a drastic loss in reputation and subsequently drastic increase in transaction costs for the culprit.

The family is the only encompassing insurance system in today's China. Obligations toward the old and sick are guaranteed by the constitution that further stipulates the family's responsibility in these cases.

The family offers an effective way to pool resources. It can pool labour and by doing so set off the still strangling labour market regulation that limits the number of employees a private firm is allowed to hire. The family can pool current savings, thus reducing costs for borrowing while, taking into account the negative interest rates in the official banking sector, offering higher returns on investment [Besley et al. 1993; Tsai 2000]. Finally, it can pool "licences" which still form a major obstacle for the expansion of the private sector. For example, by entry of one family member who holds the residency card (hutong) from a city, the family acquires entry to the urban market when the family outlet is registered under the name of the city dweller.

The development in the Chinese countryside indeed show that most private companies started as a family business founded either by a married couple or parents and children. However, as enough field studies have shown starting in the early nineties, the family business no longer prevailed in the private sector. Today, family firms are concentrated in

traditional service, such as hairdresser, restaurants, or repair shops. They remain small in scope and linked to labour intensive forms of production. Another feature of the traditional family business is also missing: Even if we allow for vast regional differences, the extended family on whose size the access to resources depends is no longer large enough to form the core for an expanding business [Carney 1998]. As will be seen presently, as opposed to manufacturing the family remained the dominant economic actor in agriculture to the detriment of both productivity and household income. Illustrative evidence further suggests that friends were regarded as a substitute for the family in the start up of a firm. That can be childhood friends, classmates, or friends with whom one has served in the army or colleagues. Subsequently, the firm is established as a 'partnership' rather than a family business [Krug 2002a].

While these partnerships form a considerable share behind private firms in general, the organisation form behind firms in rural China is dominated by another form, namely the so-called TVEs. At first sight the TVEs look like the usual "socialist firm" [Furubotn & Pejovich 1974; Williamson 1980] with the only difference that they never were subordinate to the central ministries, and subsequently central planning. Instead, they were managed by regional agencies, such as counties, townships, and the villages themselves. As mentioned above, such a view would turn local industry into the only kind of a socialist firm that made profit, expanded and remained competitive, even if moving in international markets[22]. It was not before thorough field studies investigated the TVEs that an explanation to this puzzle could be found.

It is claimed here that today's TVEs have little in common with their predecessors. Instead they should be described, and modified, as Demsetz's commons by default [Demsetz 1967]. After the villages had successfully leased arable land, they started to transfer industrial assets: Some assets were auctioned off, some were also contracted out. The decision on the mode of transfer depended on private demand. If assets could not be sold at the expected price, at least the rights to use the assets could be auctioned off. By doing so, potential investors or users acquired access to assets like fishponds, tractors, even school buildings, or land on which they could establish a factory. Demand for the run-down village firms, however, was missing. Nobody seemed interested in either buying or leasing the as-

[22] An argument found in Walder 1994 who claims that TVEs' success can be explained by size, scale and less attenuated rights for running the firms.

sets. The Demsetz case, in which private property is not asked for whenever the costs for protecting private property rights exceed returns, applies here. It was the high re-confiscation risk of capital assets over which the State still claimed control that made potential investors to shrink away. In short, the TVEs at the beginning were loss-making firms with which the village got stuck[23].

The European response in this case was often enough to close down the firms leaving the unemployed at the mercy of a centrally organized "welfare system". In the Chinese case, the inherited firms were turned into a common stock of resources (or joint use facility), owned by all but producing individually appropriable flows in terms of workplaces, and later, dividends. In order to upgrade and maintain the common stock of resources, the individual families contributed in form of voluntary parting information about new products, or marketing channels etc., and in the form of money needed for investment. It is worthwhile pointing out that these monetary contributions do not hide coerced transfers, i.e. taxation. In particular since the TVEs started to make profit, such contributions are seen as promising investment outlets. In the middle of the eighties already twenty per cent of peasant households had made capital investment in the range from eight to two thousand Yuan RMB (between one and four hundred US-$). In 1991 out of the total household income of 1,046.10 Yuan RMB, 41.56 Yuan RMB (or 5 US-$) were dividends [Nee 1989, p. 182; State Statistical Yearbook 1992, T8.20, p. 28].

As mentioned before, the governance structure of the [Ostrom] commons employs crop-sharing contracts in order to attract "adventurous" managers. The general rule is that whoever offers the most promising restructuring scheme will be appointed manager on a crop sharing contract basis. Thus, establishing the local firms [Parish 1985; Nee 1989; Oi 1989; Nee and Su 1990, Whyte 1990; Wong 1992; Parris 1993; Walder 1994, Zweig 1993; Goodman 1994; Luo 1990] as a commons ensures low transaction costs: There is an incentive to pool resources, such as labour and savings; there is an incentive to part with information that might be of value for the TVEs management; and there is the incentive to spread risk across all residents. Not to be underestimated is the intrinsic motivation of many villagers to do something, basically unpaid, for the village. Moreover, there are also

[23] It is not hard to see that this corresponds to the emergence of the "public domain" in the overall picture of the economy. It is worth mentioning that on average a township runs 1.9, the village 0.7 enterprises in 1985, providing further support to the claim that the TVE's stared as those assets with which the village got stuck.

strong incentives for the local leadership to contribute to the TVEs success in the form of providing supplementary rural infrastructure, contractual security, and favourable taxation legislation. Finally, the TVEs can shift part of their (fixed) costs, such as pension funds, unto the village or the family. With lower fixed costs they can attain the break-even point sooner than either state firms or private firms that work outside the village "patronage". All these factors add up to such an overall transaction cost advantage that, despite the poor equipment and their small size, the TVEs quickly turned into serious competitors to state firms. This can be illustrated best by concentrating on the export success of these firms [see footnote 3]. Three major factors see to have played role: First, family or personal relations with Chinese living in Hong Kong, Taiwan or overseas. Second, contractual security offered by the village, which lowered transaction costs plus the building up of a good reputation to honour obligations, which helped to attract business partners [Smyth 1997]. Third, changes in the way production is organized in modern companies outside China. Chinese village firms became major partners for outsourcing production in industries where flexible response to shifting demand and fashion is crucial, such as textile or sports wear. In the case of the Chinese rural economy, a phone call or fax constitutes a binding contract so that a lengthy correspondence or expensive legal fees can be spared [Krug 1995].

To sum up, the village nexus ensures that transaction costs for private entrepreneurs are lower thanks to an institutional setting that reduces information costs, allows to diversify risk, establishes positive innovation rents, and that without necessarily driving out economically valuable motivations, such as honesty, loyalty and cooperativeness. The TVEs as well as the individual family firms can transfer cost factors onto the village, which provides information, capital, and welfare funds. The village, furthermore, secures and guarantees long-term contracts with other domestic and foreign firms [Walder 1994; Goodman 1994b; Luo 1990; Parris 1993; Song and Du 1990].

Consequently, the individual TVE enjoys a cost advantage: compared to state firms it is exempted from having to build up welfare funds; compared to private firms working with the emerging markets, it can participate on scale economies to the extent that the village provides rural infrastructure and market information, serves as broker and guarantor of contracts free for all villagers at the costs lower tan for the individual firm facing the emerging market situation. Yet, without the corresponding governance structure this comparative cost advantage would never had emerged.

In the middle of the nineties, TVEs started to transform themselves into "Shareholding cooperative enterprises" or corporations. While the reform policy saw this as a

way to force lower level state agencies to give up control rights over industrial assets, and [conservative] upper level state bureaus to shift underemployed assets downstream, the firms complied for other reasons. They [rightly] perceived the registration as a corporation with specified ownership structures as a way to introduce private property rights, As field studies have shown another reason was to set further incentives for managers [Yep 2003; Krug and Polos 2003]. While these, as described above, could claim part of the residual profit, yet were still hampered in the decision making process. Incorporating firms by granting the managers share [or at least opinions], meant that managers could convert claims on the cash flow of companies into control rights. Finally, by way of incorporating firms, alliances could be formed with local state agencies [in the form of institutional investors] or individual politicians which having access to strategic input, i.e. expansion of the firm. These strategic alliances aim at access to non-transferable input such as learning in advance about further policy change, and protection against confiscation from above, i.e. higher level of administrative units. By turning local state functionaries into co-owner of the firms, incentives were created which bind the personal income of the individual cadres to the performance of the firm, while simultaneously codifying their rights on cash flow and control over the firm.

A Between private farming and socialist collectives

The establishment of property rights around industrial assets marked the beginning of firms as independent economic actors. Subsequently, these firms were no longer part of the Commons. This reduction in value and scope of the Commons implied a disfranchisement of peasants which no longer had a “voice” in the decisions concerning investment, employment policy, and local expenses. In striking contrast to manufacturing, the separated agricultural sector did not undergo further organisational change despite deteriorating conditions: Agricultural production which had profited immensely from the introduction of land tenancy shows a one-shot improvement in productivity accompanied by a doubling of per capita consumption [in real terms] yet stagnated after 1985 [Sachs and Woo 1997: 30]. Unfortunately, the literature on agriculture is dominated by macro-economic quantitative studies on productivity, surplus labour, or land yield [Sachs and Woo 1997; Ravillion 2002; Peng 1995] . Nevertheless, some factors are worth mentioning as they suggest that institutional misalignment might have added to the downturn in agriculture. First, the confiscation risk in form of either enforced conversion of cultivated land into real estate for commercial use, or in form of increasing uncertainty about the length of the lease contract. The latter as some empirical studies point out was not caused by the village governments’

intention to attract capital investment and workplace generating firms alone. Scrapping long lease contracts were also caused by a "re-collectivisation" of certain agricultural tasks, such as ploughing, fertilizing, harvesting in order to reap [technical] scale economies from mechanisation [Johnson 1994]. Second, price controls and the re-introduction of grain quota since 1993 or credit quota [as a means to fight off inflation] in 1990/1 and 1993/4, which left private agricultural producers undercapitalised. Likewise output prices remained fixed despite rapidly increasing input prices. Third, a reduction of agricultural [national and local] investment such as irrigation. In particular in times of credit rationing there was a crowding out of investment in agriculture as village governments expected higher returns from infrastructural investment that benefited the new industrial sector. As empirical studies show, more indirectly, but no less crucial was the reduction in local expenses for basic education [and health service] by which positive spill over effects on competence building in private farming was foregone [World Bank 1992; Ravallion 2002: 21, Tab.5].

On the micro-level we observe that the land reform form the early eighties led to land sizes too small for exploiting productivity gains from mechanisation. It also left private producers too disempowered to reap productivity gains from organisational or ownership change. Once more private farmers were no longer able to negotiate input and output prices or necessary infrastructural investment, or lobby for further property rights reform [Brand et.al. 2002; Rozelle et.al. 2003; Yep 2003]. The few empirical studies available suggest a large diversity of organisational forms, yet most of which co-ordinated by local governments rather than build on voluntary cooperation of private producers.

None the least prompted by increasing protest in the rural sector caused local governments to look for means to accommodate the demand of private producers for changes in property rights legislation and state control. The interplay between political control and private protest can explain why the organisational form of agricultural production oscillates between two hybrids [Brandt et.al.2002]. One extreme is a revived socialist collective where the "state" sets output quota, controls input, and co-ordinates activities, as is the case in grain production. On the other side there are commons Or Jointly-owned resources where in an extreme case a rental market for land ensures voluntary entry of peasants to the effect that one is tempting to argue that this form is the beginning of an agricultural cooperative, yet governed by trust-supported reciprocity.

A COMPARATIVE ANALYSIS OF ORGANIZATIONAL FORMS IN RURAL CHINA

When we observe that within twenty-five years Chinese villages experimented with three or four different forms of institutions for organizing private production and exchange in a rapidly competitive environment, then some intriguing questions challenge conventional transaction costs approaches.

In an ex post analysis it is not hard to see that indeed, both the family as the backbone for private farming or entrepreneurship, and TVEs as collective loose their transaction cost advantage with expanding markets when compared to incorporated firms under the patronage of political authorities. Yet, could such a development be foreseen? As will be argued presently, new trends in organisational ecology concentrating on the genetic material of firms, i.e. namely the architects of their organisational forms and their embeddedness with factor- or political markets might offer an analytical alternative for explaining the emergence and identities of firms better and with more predictive content.

A The transaction cost perspective

Taking into account the kind of transaction costs Chinese economic organisations faced in the eighties and nineties such as missing property rights, asymmetric information or uncertainty [see above, p.2], individual firms in order to survive needed to find solutions for broadly speaking three set of problems:

The resource constraint

The sharing rule of the innovation rent

Risk mitigation

The resource constraint in the Chinese context made it felt less in scarcity of liquidity or capital but in lack of managerial talent, lack of [market] information, and the high share of non-transferable input. In this situation the spatial dimension of a family or a village play a crucial role in defining the resource base of a firm. As empirical studies have shown [Krug and Hendrischke 2003)], the lack of managerial talent, or more general: scarcity of skilled labour, and limited access to information are the most crucial single factor limiting the scope of activities of family firms and TVEs. While both forms enjoy a transaction cost advantage as long as they move in their local environment, the transaction costs increase to sometimes prohibitively high levels when firms expand beyond their local nexus. Corporations on the other hand offering shares to information brokers or political agencies in returns for property rights protection, information, and access to strategic input offer a way

to overcome the resource constraint. It is worthwhile mentioning that the incorporated firm was not a third alternative from the beginning. Instead it emerged in the nineties as a response of successful TVEs or family firms, which wanted [or needed] to expand the local market.

With respect to the sharing of the innovation rent, the family at first sight offers the best governance structure, as the whole rent is appropriated by the "innovators". The TVES, on the other hand, seem to offer the least incentive, knowing no ex ante sharing rule. Yet, as described above, the TVEs quickly learned that crop-sharing contracts that offer the innovating manager part of profit were a powerful remedy. At a later stage, managers instead of monetary bonus asked for a share of the firm's asset, a demand the TVEs needed to comply to if they did not want to run the risk to loose the innovative manager. The effect was that over the years managers became, if not sole owner, then majority owner of a new incorporated company. As said above such MBOs are the most dominant form of privatisation in the Chinese countryside. In this case the TVEs did not disappear due to increased competition in the product market, they responded rather to increased competition in the nascent market for managerial talent. Once more the disappearance of this organisational from needs to be seen as a response to ensure the survival of the firm.

The family firm is too restricted by its limited pool of innovative potential. Its innovation rent quickly withers away once professional and technical knowledge beyond the boundary of the family is reached. With no innovation, its sharing rule becomes obsolete. As the empirical studies have shown, corporations on the other hand, by either offering performance related work contracts, or shares found it easier to buy-in [or contract-in] expertise in marketing and distribution, or the export sector in particular in the food processing and manufacturing industry. By forming personal or organizational business relations they quickly restructured production and customer relations within their organisational structure [Hendrischke 2002]. In short, while the device of management buy-outs ensures and rewards innovativeness with respect to "what to produce" and "how to produce", the corporation ensured the buying in of innovative potential via contracts or "partnerships" in new specialised market-oriented companies [Hendrischke 2003].

One of the most striking feature of economic development in the Chinese countryside is that the reforms did not result in the emergence of specialized farming and a surrounding food processing industry. From the beginning, families and TVEs quickly tried to diversify into unrelated business sectors. As empirical studies show, there is neither a notion of a core competence nor a notion of the advantage of vertical integration in the pri-

vate business sector making some authors even claiming that Chinese culture will preclude the development of Chinese multinationals [Nolan 2000; 2001. However, as the investment policy shows, and interviews confirm, such a strategy is not based on cultural features, but rather seen as an effective device against natural hazard and the still high confiscation risk when political authorities by extortion of more subtle means such as ad hoc taxation claim part of the firms cash flow.

To invest in industries less vulnerable in case of floods or droughts, such as manufacturing, is one way to cope with natural hazard, to move production to another location less affected my natural hazard is another way. Moreover, to invest in another part of the country translates into moving into another jurisdiction in the decentralised fiscal system of Reform China. In other words, by investing across country or provincial boundaries [or other sectors] firm can diversify risk.

It is obvious that with respect to such a risk management, the family being concentrated around its place of origin is at disadvantage. The family can command only two long-term strategies [Rosenzweig 1988]. One is marrying out children to other places, if not continents and by doing so establish trustworthy business relations monitored by a family member. Another strategy is deploying a family member in another locality by acquiring a resident's permit. It is worth emphasizing that many families find it easier and more profitable to seek settlement rights abroad, let's say North America, rather than in another part of [rural] China. Migration, marriage, or lengthy formal education are still the only means by which family firms can change scope and competence of the firm, or diversify risk. The TVEs in this respect are not unlike the family. They to cannot easily invest in other parts of the country. To do so is possible only after full-employment in the village is reached and depending on lengthy negotiations with political authorities in the targeted locality, which in most cases will ask for a share in the new firm established within its jurisdiction. Once more, the effect is a "corporatisation by default". TVEs in order to survive need to give up their concept of collective ownership.

To sum up, the family firm with its small resource base and limited risk diversifying devices is at a comparative disadvantage when compared to the TVEs and the corporation. That the family business in China today finds itself driven to the margins of markets surviving in small-scale, traditional service industries - or as small-scale lease holder - does not come as a surprise in an ex post analysis.

Yet there remains the intriguing question why the family once more the backbone of agricultural production did not succeed in changing the organisational form by for ex-

ample forming cooperatives. Pending on further empirical studies, a preliminary explanation points to the supply side where the state insists on its dominant role by adhering to a mix of ill-defined property rights, regulation, and taxation which severely limits private exchange of resources, input and output. Another explanation pints to the demand side and the fact that peasants might resist to control over land on the ground that land is the "last resort" for securing the basic need of the family.

The TVEs though in control over a larger pool of resources share many characteristics with the family firm, such as being restricted by a geographically defined pool of resources and limited abilities to form political alliances. Once the initial endowment [of resources] is used up, they face the same problem as families. And as families TVEs settled for the same solution, namely incorporating the firm. To understand this process, some new approaches, not yet fully developed, might prove fruitful.

B ORGANISATIONAL ECOLOGY

The difference between the research agenda of organisational ecology and transaction costs economics [or new Institutional Economics][24] can be summarized as follows. In the literature on the Chinese economic sector as in the general organisation theory literature, firms are usually identified by structural elements such as ownership, size, sector, scope, age or link to the product market. This set of properties is then employed to assess the comparative advantage, further development if not the survivability of firms. Seldom are firms identified by their link to other (factor) markets, let alone the blueprint of the architects of firms. But indeed as recent studies have shown, the vision of the founding fathers with respect to organizational form of firms and their interrelation with the "environment" do matter [Baron and Hannan 2002].

The approach in organizational ecology, and forming the base of the empirical study underpinning the analysis presented here, concentrates on the genetic material of firms, namely the intention of the architects of firms and the cultural environment that shapes their intentions and makes them looking for the best fit with the environment. For this reasons the development of institutions and firms became an essential part in the interviews with Chinese entrepreneurs. It was in particular the life history of the firms, the in-

[24] For example Nolan 2001. On the other hand, Guthrie 1999 and Yep 2001 seem to aim at a similar research agenda without making the approach explicit.

tentions of the founders of the firms, and the institutions employed, by which they had aimed to secure the survival of their firm, which offer additional insights into the development of a private business sector. The main reason for doing so was the observation that firms in China despite being located in the same industry, or location, being similar in age, size and scope of activities showed differences in organizational forms. They can be summarized as follows [Krug 2003; Krug and Hendrischke 2003]:

Going beyond the topic analyzed here, the interviews showed going beyond this that the variety in organizational forms of firms was not limited to family firm, TVEs, commons and corporations. Other organizational forms such as trust where the pooling of resources and co-ordination of economic activities are governed by reciprocity, alliances, best compared to [Buchanan's] clubs [Buchanan 1965], or networks offered additional evidence that economic actors searched a better "fit" with the economic environment while trying to reduce transaction costs [Krug 2003]. Other significant differences showed in their connectedness with the factor market. Some firms aimed at an organizational form that would secure steady supply of state-controlled resources. As a result the firm looked more like a "public firm" in which state agencies kept a majority share of assets. Some firms took an organizational form that promised access to modern technology. These firms mostly took the form of spin-offs of universities and had chosen for an organizational form not unlike "partnerships" in the Western legal definition. Other firms were spin-offs of villages [or industrial bureaus], which aimed at separating their commercial from their administrative functions. In order to catch the differences in organizational form and governance structure, the interviews explicitly asked entrepreneurs and managers what mechanism, institutional devices, and organizational forms they had chosen when they set up a firm or searched for a better "fit" with their economic/political environment.

Such a procedure is ambitious in so far as it attempts to use the history of the firm (or local agencies) as a way to looking into the future. A the empirical study showed the "mental map" of the architects of new firms is crucial when, for example they need to decide whether to become the sole owner of a firm, even if this would imply to remain small, and limited by a small resource base so that they would serve a local market only. The alternative, namely incorporating the firm and trading shares for access to scarce resources, or mergers might find its ex post explanation in the economic constraints, yet in the last analysis such a decision depends on the personal intention, if not ambition of the entrepreneurs. One of the striking results of the empirical study is for example that the family firm disappeared as an organizational form because enough founders did not want to have a

family firm. They were rather explicit in their intentions and strategies. Even if the founders had accepted money from the family they regarded this as a [short term] loan to be paid back as soon as possible. The most frequently given reasons were first, the poor resource base, of a family, and second, lack of trust in the managerial competence of family members. To put it differently, only those families determined to serve the local market only, such as restaurants, boarding houses, hair dresses etc. run a family business. Likewise, those families who for emotional or safety reasons cling to their land are will rather forego productivity gains than pooling [or giving up] land. Entrepreneurs, on the other hand, willing to build up a company expanding beyond the local market and local resource base quickly turned to other economic actors for help. In the first stage these help was provided by friends from childhood, university or the army, at a latter stage, business networks were build up connecting firms and entrepreneurs of similar interests [Hendrischke 2002].

To start with the intentions of managers and forms implies to see the firm as culturally and socially embedded [Granovetter, M. 1992]. As the interviews and the experiments in and around Chinese firms clearly show, there is no quasi-technical automatism at work which prompts entrepreneurs or farmers to, let's say, search purposefully for transaction cost saving devices. How precisely culture influences individual behavior is still not yet fully explored. The empirical studies so far suggest that [political or commercial] entrepreneurs use "traditional" institutions predominantly for allocating control rights, designing long-term business relations between economic actors, and for "dispute settlement [Krug 2002c; Krug and Belschak 2001].

The assumption that firms or farming gain identity by cultural and social embeddedness rather than by their structural properties needs to be seen in contrast to transaction costs economics. While for example transaction costs economics would claim that Chinese firms switch to another organizational form if this promises lower transaction costs, the embeddedness approach sees the transaction cost advantage as the outcome of searching for a better fit with the economic and social environment.

Finally, the assumption that organizational forms or identities will differ depending on the "mind set" of the architects of the firms but also depending on the ways chosen how to connect the firm to its social environment can offer additional insights why we find different forms of firms in the new business sector as opposed to the organizational inertia we observe in the agricultural sector. In the last analysis the changes in organizational form of institutions and firms indicate that three factors were decisive: The intentions of entrepre-

neurs to harness [private] property rights, and to broaden the resource base and to ensure the survival of firms by ensuring a stable institutional environment.

Conclusion: How to model the re-structuring of China's rural sector

One striking feature in China's transformation from a socialist to a market economy is that economic development was accompanied by frequent changes in organisational forms in and around firms. The rural sector as described above illustrates this aspect, and draws our attention to a deficit in the TCE literature.

As was pointed out elsewhere (Menard 2002) the literature on organizational choice centres around "aligning" governance structures with specific attributes of private exchange when it is claimed that in a competitive environment such organizational forms will be chosen that offer the lowest transaction costs. In contrast, the need to align organizational forms to the general economic environment, has yet received less attention[25]. Subsequently, the market-hierarchy dichotomy cannot be fruitfully employed to cases such as China where markets and legally independent firms (hierarchy) are missing at the beginning at the transformation. Instead, as the development in China's rural sector suggests the so-called hybrid forms in the Williamson world become the crucial actors for explaining the emergence of both: firms and markets.

Another way to model organizational choice is to claim that economic actors choose that transaction cost minimizing form which "aligns" best to both specific features in exchange, as operationalised by asset specificity AND specific features of the economic environment, as operationalised by a property right regime. The conventional model would offer the case where the economic environment is taken as given and stable, thus reducing organizational choice to two variables transaction costs and asset specificity[26].

The case of China's rural sector suggest the complementary model, namely one in which asset specificity is assumed to be given and stable, linking organizational choice to the external economic environment. It is then claimed that economic actors will choose such transaction cost minimizing organizational form, which aligns best to the economic environment. One way to operationalise the specific features of an economic environment

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[25] An exception would be that part of the literature that focuses in the interplay between economic - social environment and the generation and employment of social capital, see Putnam 2000; Fukuyama 1995; Granovetter 1992).

[26] For the following see Menard 2002.

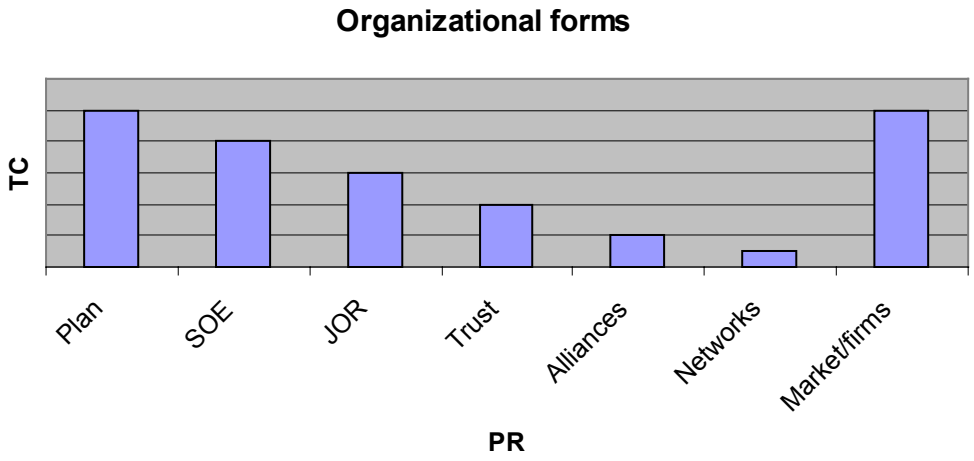
is to single out different property rights regimes, by using the following broadened concept of property rights: The property rights regime on an economic system in addition to the conventional definition of microeconomics, namely the opportunity to utilise resources for the purpose of consumption, production and exchange, includes political freedom, i.e. the right

To decide who governs firms and on which principle [ownership]

To form associations with whose support external regulation can be forestalled, and the reputation of firms and industries can be enhanced.

Finally, transparency to prevent corruption, but also as a means for "informed" choice.

Depending on transaction costs (TC) and the attenuation of property rights (PR) the findings of the development of China's rural sector can be summarized as follows:



In the graphic, the column depicting hierarchy in a planned economy is defined by the fact that changes in transaction costs will not cause changes in the property rights regime, while individual firms [economic actors] will strive for better defined property rights even if transaction costs will remain the same.

The empirical studies in China's rural sector suggests the following organisational forms [or hybrids]:

Informal, illicit networks generating a black market within the planned economy that allow co-ordinating production despite e legal risk at lower transaction costs than operating in the official planned economy only [Kornai 1986];
State owned enterprises, or socialist collectives with limited rights to control assets, and under obligation to cover current operational expenses but not entitled to appropriate residual profit [Shleifer and Vichny 1993];

Commons or Jointly-owned Resources as analysed above, where property rights of a collective are acknowledged in the sense that the "state" no longer claims or competes for the use of the same resource;
Trust where independent and individual economic actors co-ordinate resources and activities based on norms of reciprocity;
Alliances, where economic actors pool resources in order to exploit precisely defined co-operation gains;
Networks working as surrogate markets in cases where both market co-ordination and vertical integration would generate higher transaction costs.

The last three forms lie outside the topic of this paper, as the following use of the model for explaining the restructuring of China's rural sector will show:
First, the switch from SOEs [or Production brigade, i.e. the Chinese form of socialist collectives] to the organizational form of the commons [or trust] reflects attempts to gain "political freedom", more precisely the attempt to become an independent economic actor responsible for profit and loss, empowered enough to allocate resources, establish a "legally" defined firm, and embark on long term business relations unthreatened by ex post confiscation of assets of cash flow [Shleifer and Vichny 1993]. As long as this kind of freedom is not guaranteed individual [Schumpeterian] entrepreneurs face high transaction costs even if there are already nascent markets [or if they would function in international markets] due to political sanctioning, high share of non-transferable input and lack of resources. Second, trust based institutions seem to be that organizational form where individual actors start to play a significant role in decisions on investment, pooling of resources, or allocation. Third [and outside the scope of this paper] the higher transaction costs of the other forms, i.e. alliances or networks seem to reflect asset specificity as analysed in the conventional TCE, and/or the search for means to further harness private property rights in an environment where there are still no constitutional guarantees and state-organised enforcement.

Finally, that agricultural production in china got stuck, or oscillates between socialist collectives and commons since the middle of the eighties, needs to be explained by the fact that Chinese peasants still work in an environment of poorly-defined property rights where they still have to fight for the political freedom as defined above. Industrial production in Chinese villages on the other hand, due to changed legislation and increasing competition could make the switch from the organizational form of the commons to incorporating firms and by doing so establish private property rights.

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