

Vertical Coordination in German Pork Production: Towards more Integration?

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Paper presented at the 16th Annual World Forum and Symposium “Agribusiness, Food, Health, and Nutrition”, IAMA Conference, June 10 – 13, 2006 in Buenos Aires, Argentina

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Abstract

In recent years the vertical organization of meat supply chains has been among the most vividly discussed topics in agriculture and the food industry. Many authors hypothesize that contracts and vertical integration are paramount for the future competitiveness of pork production. Although there is a broad spectrum of theories concerning the organization of supply chains, most arguments so far are based on Transaction Cost Economics. In this paper we contribute to the theoretical foundation of the ongoing discussion by referring to a broader spectrum of organization theories and, thus, shed a new and somewhat different light on the question, which form of vertical organization might be the most efficient one for the German pork sector. Furthermore, we present empirical evidence on farmers' attitude towards contracts. It is concluded that the search for a "one best way of organizing" pork production might be misdirected and that the coexistence of different ways of organizing food supply chains can be expected even in the long run.

Keywords: equifinality, organization theory, pork production, transaction cost economics, farmers' attitudes

1 Introduction

Vertical coordination describes the way relationships between producers and processors are organized in food supply chains. This is not a yes-or-no decision; instead, there is a broad spectrum of alternatives farms and firms can choose from when designing their business relationships (Peterson *et al*, 2001). In pork production, mainly two different organizational solutions prevail. In many European countries, like Germany, the Netherlands, Belgium, and France, spot market transactions between farmers and abattoirs, informal long-term relationships and marketing contracts establishing selling and buying obligations for farmers and slaughterhouses are still dominant (Traupe, 2002; Boston *et al*, 2004; Spiller *et al*, 2005). All in all, pork production chains are comparatively loosely organized concerning the degree of vertical coordination. In other important pork producing countries, for instance the United States and Denmark, Brazil and Spain, stricter forms of vertical coordination have largely or at least partially replaced less coordinated forms of pork production. In these countries production contracts and contract farming, both strongly reducing farmers' entrepreneurial freedom and making them more or less dependent on centralized decision making by processors, or even vertically integrated production systems with farms owned by slaughterhouses which procure slaughter pigs in-house prevail (Schulze *et al*, 2006a).

In many countries, pork production chains have been undergoing changes towards stricter coordination. In the United States, for instance, more vertically integrated forms of pork production have largely replaced open markets. Today more than 70 % of U.S. pork production is produced under production contracts, contract farming or in vertically integrated production systems owned by large slaughterhouses. This parallels a trend in U.S. agriculture according to which nowadays about 36 % of agricultural products are produced under contracts and in vertical integration (Martinez, 2002a, 2002b; MacDonald *et al*, 2004). Similar developments took place in the Danish pork industry in the 1960s and 1970s. Farmers

close to a certain abattoir were forced by contracts to use a special breed in order to supply homogeneous animals through which the respective slaughterhouse was able to serve specific market segments, for instance, the British bacon market or the Japanese market. The Danish coop Danske Slagterier has used contract farming to produce homogeneous pork products in large quantities. For developing and transition economies, contract farming is seen as a means to establish modernized agri-food chains. Boger (2001), for example, discusses the use of production contracts in the Polish pork market as an instrument to establish high quality markets without widely used grading systems for pigs.

Many authors argue that stricter vertical coordination of pork supply chains is paramount for their future competitiveness and that insofar the United States and Denmark can be considered blueprints for other pork producing countries. Some authors argue empirically and take the successful export strategies of Denmark and – since the mid-1990s – the United States as an indicator for the superiority of more vertically integrated supply chains (Windhorst, 2004). Others mainly refer to Transaction Cost Economics to give reasons for the observed organizational changes in pork production chains (see, for instance, den Ouden *et al*, 1996; Lawrence *et al*, 2001). Germany, however, is still characterized by a low level of vertical coordination. For example, in the 1990ies, Unilever sourced meat used for branded sausages only from Denmark because of safety risks in uncoordinated chains. This raises the question, whether the German pork production should follow the example of the above described countries and engage in stricter vertical coordination.

In this paper we critically examine standard transaction cost arguments. Furthermore, we refer to alternative organization theories in order to analyze the efficiency of alternative ways of organizing supply chains from different theoretical perspectives. Finally, we present empirical results about farmers' attitudes towards contracts in meat supply chains. Some conclusions about the future organization of pork supply chains close the paper.

2 Contracts and Vertical Integration in Livestock Production: A Transaction Cost Perspective

Transaction Cost Economics (TCE) provides the most widely used theoretical framework for analyzing the vertical organization of food supply chains especially in livestock production. Key variables in TCE characterizing the situation under which transactions take place are the degree of asset specificity and the amount of uncertainty in a market (Klein *et al*, 1978; Williamson, 1985). In the comparative analysis of discrete structural alternatives proposed by Williamson (1991), organizational alternatives are evaluated according to their ability to cope with these contingency factors due to their adaptive capacity either through autonomous or cooperative decision making, incentive intensity and level of administrative control. Since TCE is strongly influenced by the contingency theoretical concept of fit between situational and organizational characteristics and its relationship with performance (Donaldson, 2001), transaction cost theoretical arguments in favor of stricter vertical coordination of food supply usually declare changes in the degree of asset specificity or the amount of uncertainty.

One of the pioneering papers applying the TCE perspective to meat supply chains was published by den Ouden *et al* (1996). The authors identify growing quality requirements of customers as a major driving force of more contracts and vertical integration. In particular, product differentiation in order to meet changing consumer demands regarding credence attributes such as animal welfare, food safety, traceability, and environmental issues is

considered a main driver of closer ties in meat supply chains. Organizing an information flow along the supply chain for transmitting the changing customer demands to the farm stages is considered more transaction cost efficient under contracts and in vertically integrated systems.

Lawrence *et al* (1997) offer a similar explanation. According to their empirical studies, "... synchronizing pork quality, food safety, and other difficult-to-detect attributes of the pork produced to the more discriminating consumer (domestic and export) also provides incentives for non-market coordination" (Lawrence *et al*, 1997: 28). The authors argue that spot markets are only very limitedly able to transmit quality-related information in food chains. Therefore, farmers as well as slaughterhouses save transaction costs through contracts and vertical integration. Farmers may save transaction costs through long-term contracts, e.g., by settling a premium for higher quality with a one-time negotiation. Since this advantage is less relevant for small farmers, mainly large farmers enter contractual arrangements. For slaughterhouses high quality of pork and consistency of supply with adequate quantities are paramount. Lawrence *et al* (1997) find that under these circumstances long-term contracts allow transaction cost savings compared to traditional marketing channels.

According to Hobbs *et al* (2002), quality uncertainty is a major concern in agribusiness due to various food crises especially in the meat industry. Therefore, it is often argued that "information externalities, arising from uncertainty concerning the nature of food quality and problems in detecting quality, may be reasons why vertical coordination is being used to circumvent the marketplace" (Hennessy, 1996). Monitoring costs arising, for instance, from improved traceability due to changes in food safety legislation and consumer concerns about credence attributes such as animal welfare do not only influence the degree of vertical coordination in pork production but also in the beef marketing chain (Hobbs, 1996). Pork and beef packer surveys both reveal that securing higher and more consistent quality of pork and cattle are the most important reasons for increased contractual relations with producers. The latter allow transaction cost savings through reducing the number of buyers and the number of buying stations (Lawrence *et al*, 2001).

In more recent studies on the British beef sector, Fearne (2003) and Hornibrook and Fearne (2005) found that vertical partnerships are now the dominant organizational form in the British meat industry. These partnerships do not only include producers and abattoirs but have been extended further up the supply chain to include breeders and compound feed producers and down the supply chain to include retailers. Again, key drivers of this development are changing attitudes and purchasing behavior of meat consumers, food safety legislation and food crises, especially the outbreak of the BSE crisis. Especially retailers who have introduced private labels or use their company's name as a brand put great emphasis on product safety and quality. In these cases, specific investments in brands require safeguards against food crises and a subsequent loss of reputation. Therefore, retailers have strengthened their influence on the meat supply chain and nowadays largely refrain from spot market transactions. But, apart from transaction cost considerations, competitive strategies of supermarket chains aiming at differentiation from the competition through exclusive offers have also turned out to become a major driving force.

Another driver towards more contracts and vertical integration may stem from specific investments and/or the necessity of a high cooperative adaptiveness of meat supply chains. In most cases specific investments are necessary when special market segments are served. In Germany, for instance, the former semi-official meat label schemes required farmers to invest in a non-negligible amount into above-average housing conditions, feed compositions and

documentation procedures. In these programs farmers typically entered into contractual agreements with slaughterhouses and processors. Similarly, in the niche market of organic livestock farming characterized by special process qualities contracts safeguarding farmers as well as processors against opportunistic behavior are also prevalent. Similarly, some export markets also require special product qualities and a high degree of vertical coordination concerning pig phenotypes and marketing. The Japanese pork market, for instance, is famous for its specific consumer demands concerning taste, marbling, cutting and so on (Makise, 2002). Since vertically disintegrated chains do not provide the required quality and cooperative adaptiveness, the Japanese market has mainly been served by contractually bound or vertically integrated pork producers from Denmark or the United States.

To summarize, standard TCE arguments typically refer to changing or very special customer demands and growing uncertainty to give reasons for stricter vertical coordination in meat supply chains. Contracts are expected to reduce moral hazard problems through centralized decisions about input factors (feed, genetics etc.) and production standards. It is argued that the problem of adverse selection in case of unobservable quality characteristics (credence attributes) is decreased by contract systems with inherent monitoring approaches. This argumentation parallels findings from other industries such as the apparel industry where high quality uncertainty also favors long-lasting contract-based relationships with dealers and manufacturers (Masson *et al*, 2005).

In studies these widely spread arguments have been critically examined and confronted with recent technological and institutional changes. Dias de Moura *et al* (2002), for instance, argue that tighter product specifications in themselves do not necessarily lead to stricter coordination in supply chains. Schulze *et al* (2006a) highlight two important developments which challenge standard TCE arguments.

First, new sorting technologies in combination with large-scale slaughtering lower the degree of asset specificity between pork producers and processors. Toennies, for instance, Germany's leading pork packer, has created a number of different internal classification categories into which the animals are sorted using automatic pre-slaughter classification technologies. Then the different batches are divided by automated sorting technologies to produce about 1,000 different products tailor-made for special market segments. Slaughter capacities of about 20,000 pigs per day enable the company to produce sufficient quantities of uniform meat without defining homogeneous input factors. Instead of relying on contracts to guarantee supply of uniform animals, Toennies strongly prefers diverse animals to be sure that suitable meat is available for every market segment. Therefore, Toennies turned out to become one of the most prominent defenders of open markets in pork production.

Second, the emergence of certification schemes in European agriculture creates more favorable conditions for spot market transactions. Regular inspections carried out by independent bodies beholden to standards laid down by external organizations (so-called third-party audits; Luning *et al*, 2002) enforce minimum quality standards and reduce buyers' quality uncertainty and, hence, search and quality control costs. According to TCE, this strongly favors arm's length solutions in food supply chains (Schramm & Spiller, 2003; Giraud-Héraud *et al*, 2005). In Germany, for instance, more than 54,000 farmers are members of the Quality and Safety System. In the Netherlands, IKB has reached more than 90 % of all farmers. This development is brought forward by benchmarking processes through which standard setters mutually accept their certification standards. In 2004 QS, IKB and Danske

Slagterier, for instance, agreed on a common quality approach called European Meat Alliance. The retailer-driven EurepGap system also allows benchmarking processes.

All in all, despite their decade-long dissemination and broad acceptance, standard TCE arguments concerning the organization of meat supply chains still stand on somewhat shaky ground. Furthermore, there are other factors besides transaction costs strongly influencing governance structures. Among these are the search for monopoly power, core competence arguments, and behavioral aspects such as motivation, involvement and attitudes. For further clarification we therefore turn to different theoretical strands as well as empirical results stemming from a large-scale study in Northwestern Germany to shed additional light on the controversially discussed question of the efficient future organization of meat supply chains.

3 Beyond Transaction Cost Economics: New Theoretical Perspectives on the Organization of Pork Production

Economic and management theories provide a broad spectrum of different approaches to the organization of food supply chains. The microeconomic theory of the firm mainly asks why firms do exist and what factors do determine the firms' boundaries relative to the market (Holmstrom & Tirole, 1989). Answers to these questions are given by neoclassical as well as new institutional economics, including TCE. Most management theories dealing with the aforementioned questions employ a strategic or an organization theoretical perspective. Strategic management theories consider the degree of vertical coordination in supply chains a way of influencing the competitive forces in an industry or of gaining and sustaining competitive advantages (see, for instance, Porter, 1980). Organization theory offers very diverse conceptual approaches to the vertical coordination of food supply chains. In this paper we refer to decision-oriented organization theory on the one hand and a motivation and knowledge-based approach on the other hand to gain new insights into the efficient organization of meat supply chains.

Decision-oriented Organization Theory and the Organization of Meat Production

The decision-oriented approach in organization theory considers firms as well as supply chains as decision systems. Due to the bounded rationality of each decision maker (Simon, 1947/1997), the division of labor in and between firms is inevitable. The division of labor results in efficiency gains through specialization and economies of scale, but also in a need for improved coordination and a solution to agency problems. The decision-oriented approach mainly focuses on coordination problems which therefore are centered in the following analysis.

The coordination problem can be traced back to separate decision-making by different decision makers within companies and food chains. Since each decision has effects on, for instance, other companies in the food chain, there has to be a certain amount of communication in order to coordinate activities. In the decision-oriented approach in organization theory interdepartmental (McCann & Galbraith, 1981) as well as interorganizational (Borys & Jemison, 1989; Gulati & Singh, 1998; Lazzarini *et al*, 2001) relationships between semi-autonomous decision-makers are called interdependencies. An interdependence can be defined as a situation in which decision-maker A's decision and subsequent action influences the situation decision-maker B faces when making her or his own decision (Frese, 2005). In a company A and B can be different departments; in a food

chain they can be, for instance, a farmer and a slaughterhouse or a food manufacturer and a retailer. Coordination requirements created by input-output relationships are called process or work flow interdependencies (Becker & Mathieu, 2003; Frese, 2005; Van de Ven *et al.*, 1976). They can be further distinguished into ‘one-way’ or sequential and ‘two-way’ or reciprocal interdependencies (Thompson, 1967).

The complexity of the coordination problem is determined by a quantitative and a qualitative aspect. The quantitative aspect grasps the sheer number of interdependencies between semi-autonomous decision-makers, i.e. departments or firms. The more intense the division of labor, the more interdependencies result and – all else being equal – the larger the need for intra- or inter-firm coordination through communication. The qualitative aspects describe how difficult the coordination of particular interdependencies is. The coordination requirements depend on the geographical as well as the cognitive and emotional distance between transacting parties (Lawrence & Lorsch, 1967; Van Dijk *et al.*, 2003). The more difficult an interdependence is to coordinate, the more elaborated coordination mechanisms such as face-to-face communication have to be implemented and the higher the probability of imperfect coordination of various activities (Theuvsen, 2004a).

In food supply chains coordination problem stemming from the existence of inter-firm process interdependencies are mainly relevant when not only products (slaughter pigs, pig meat and so on) but also additional information has to be transmitted along the chain. Process interdependencies function as obstacles (or ‘rocks’) which can interrupt or distort the information flow along the food chain. The larger the number of interdependencies or the higher their coordination requirements and, thus, the more imperfect inter-firm coordination is, the more probable is the loss or distortion of information.

Information flows in food supply chains can be directed upstream or downstream. Upstream information flows may aim at informing transaction partners about delivery quantities, qualities or dates. They can also be necessary when extrinsic quality attributes such as country or region-of-origin or process standards (organic farming, certified quality, improved animal welfare and so on) have to be communicated to downstream customers and, finally, consumers. Downstream information flows are required to communicate expected delivery quantities, qualities or dates to suppliers or to inform upstream industries about changing customer expectations concerning product or process qualities. In many cases, for instance when tracking and tracing food products, simultaneous upstream and downstream information flows are necessary (Theuvsen, 2003).

The vertical organization of food supply chains has a strong influence on the number and coordination requirements of inter-firm process interdependencies. The higher the degree of specialization in a food chain, i.e. the more technically separable activities are organized separately in different companies (Perry, 1989) and the higher the number transaction partners, for instance due to the prevalence of spot-market transactions, the more difficult it becomes to guarantee that all “stakeholders have a shared understanding of, and access to, the product-related information that they request, without loss, noise, delay and distortion” (Hofstede, 2003: 18). Stricter vertical coordination and vertical integration are viewed as ways to reduce the number and the coordination requirements of inter-firm interdependencies and, at the same time, to improve communication due to better mutual understanding and more trust in business relationships (Theuvsen, 2004a; Frentrup & Theuvsen, 2006).

From a decision-oriented viewpoint, stricter vertical coordination in food supply chains is necessary only if there is a need to transfer more information upstream or downstream and if this information flow might be hampered by interdependencies because there is no reliable technology to overcome or circumnavigate “rocks” in the information flow. Although there are without doubt more challenging demands for more information accompanying the product flow, there are also several reasons why stricter vertical coordination in meat supply chains may only serve as an *ultima ratio*. First, consumer preferences change comparatively slowly and, thus, can be communicated to producers and farmers without vertically integrating the chain but through, for instance, adapting carcass grading systems. Second, consumers’ willingness to pay for, for instance, more animal welfare or improved traceability is often much lower than hypothesized and consumer demands can also be met in vertically disintegrated chains. Finally, new technologies such as Radio Frequency Identification (RFID; Bhuptani & Moradpour, 2005), improved barcodes (e.g., EAN 128) and other advanced tracking and tracing technologies (Blackman & Popoli, 1999) strongly improve the information transfer capacities of open markets. Since stricter vertical coordination of meat supply chains is a two-edged sword characterized by unquestionable advantages as well as non-negligible drawbacks, we hypothesize from a decision-oriented perspective that it will be most probably implemented in certain niche markets such as those for organic farming, region-of-origin or animal welfare-friendly products. It is only in these niche markets that information transfer necessities may become so high that obstacles to information exchange stemming from inter-firm interdependencies cannot be overcome by non-organizational solutions such as advanced tracking and tracing technologies. In the mass market for standard products the advantages of stricter vertical coordination regarding information flow will quite easily be outweighed by unintended side-effects.

Motivation and Knowledge-based Organization Theory and the Organization of Meat Production

Whereas TCE mainly analyzes market failures due to asset specificity and information asymmetries which may justify the supersession of (spot) markets by stricter forms of vertical organization of supply chains, the motivation and knowledge-based approach centers the specific strengths of non-market forms of coordinating economic activities. The basic hypothesis is that non-market forms of organization such as firms have a broader repertoire of mechanisms to control human behavior and that this may turn out to be advantageous under certain situational conditions. The control repertoire of non-market forms of organization is different from that of markets in three respects (Osterloh, 1998; Osterloh *et al*, 1999):

- **Coordination:** Whereas markets almost exclusively rely on prices as means of coordinating demand and supply, firms – and to a certain degree also contract-based long-term relationships between firms – can employ hierarchies (i.e. fiat; Williamson, 1985), prices, for instance through profit-center organizations, and shared norms, values and attitudes, i.e. organizational culture.
- **Knowledge:** Markets are specialized in exchanging explicit knowledge but weak in producing and communicating implicit or tacit knowledge, i.e. knowledge which is hard to put in words and can only be shared through face-to-face communication or shared experience (Nonaka & Takeuchi, 1995). Tacit knowledge is predominant in knowledge- and learning-intensive working processes typical of many professional service industries (Lowendahl *et al*, 2001; Alvesson, 2004). Non-market organization forms allow organizing knowledge-intensive teams and, therefore, handling tacit knowledge. Not only

firms but also collaboration in a relationship management framework (Goldsmith & Gow, 2005) or a regional cluster (Steiner & Hartmann, 1998) makes transmission and exchange of tacit knowledge easier.

- **Motivation:** Markets create strong incentives through the norm of reciprocity under which each performance of a transaction party requires an equivalent *quid pro quo* delivered by the other market side (Gouldner, 1960). Therefore, rewards are strongly dependent on market success. Organizations are also able to generate extrinsic motivation although to a somewhat lesser extent since rewards are weaker and more loosely dependent on individual and firm performance. But due to these low-powered incentives, firms and other non-market forms of organization are also able to create intrinsic motivation, mainly through granting participation or autonomy in decision making processes, conveying feelings of competence to employees and creating social relatedness which enhances group identity (Osterloh, 2006). Intrinsic motivation is necessary when a lack of controllability and compatibility, measurement problems, the existence of large crowding-out effects (Frey, 1993), multi-tasking problems (Prendergast, 1999) or employees not attributing a positive valence to higher contingent rewards foreclose the implementation of incentive systems in order to foster extrinsic motivation (Theuvsen, 2004b).

Whether or not the broader repertoire of control mechanisms in stricter coordinated, i.e. contract-based or vertically integrated, supply chains provides efficiency gains depends very much on the situational conditions concerning motivational and knowledge requirements. Following Osterloh and Frost (2000), Osterloh and Frey (2000) and Osterloh *et al* (1999), we can make two important distinctions: First, is the production and transmission of explicit or implicit knowledge prevalent? Second, is extrinsic motivation sufficient or is intrinsic motivation crucial for task performance? Table 1 combines both dimensions and suggests typical organizational solutions for each situation.

Table 1: Motivation and knowledge-based organization (following Osterloh & Frost, 2000)

		Knowledge	
		Explicit knowledge	Tacit knowledge
Motivation	Extrinsic	<p>1</p> <p>Market</p> <p>Profit-center organization</p>	<p>2</p> <p>Independent knowledge worker</p>
	Intrinsic	<p>3</p> <p>Knowledge-producing teams, e.g. task forces or quality circles</p>	<p>4</p> <p>Knowledge-based production teams, e.g. cross-functional teams</p>

Cell I contains organizational solutions which are characterized by very high autonomy. Since there is no need for intrinsic motivation and the production or transfer of tacit knowledge, there is no reason to give the high flexibility and high incentive intensity of markets away. Where organizations do already exist, they are very loosely coupled due to the implementation of, for instance, profit centers which mimic open markets as much as possible.

Cell 2 describes the typical organization form for knowledge-intensive services individually performed by professionals on the basis of their comprehensive education and training. The professional bureaucracy (Mintzberg, 1979) is used in this case to organize the work of, for instance, lawyers, consultants or sales professionals.

Cell 3 is best suited for work which needs much intrinsic motivation to transform so far implicit into explicit knowledge. Quality circles as the main building block of continuous improvement processes in a Total Quality Management approach (Pfeifer, 2002) are typical examples of knowledge-producing teams. In a quality circle team members share and combine their intimate and so far unexpressed knowledge about production processes to generate new best practices for work procedures which can be shared with other groups and, by this, can become the new production standard (Adler & Borys, 1996).

Cell 4 deals with knowledge-based production teams in which the tacit knowledge of various specialists has to be combined during task performance. Creative team work in a marketing agency or the team-based production of new software solutions are typical examples.

Applying this theoretical framework to pork production requires positioning this industry in the matrix described above. In the past pork production has been controlled through extrinsic motivation. Carcass grading systems have evolved as the most widely used way to communicate expected qualities to farmers. From an organization theoretical perspective, carcass grading systems are typical output control mechanisms (Ouchi, 1979) also known as results control (Merchant, 1985) or performance control (Mintzberg, 1979). Output control introduces feedback systems which direct attention of the controlled persons, in this case pig producers, to critical performance variables such as lean meat content and rewards goal attainment. Grading systems can be adapted to changing customer demands. In German pork production, for instance, the growing number of changes of carcass grading systems has often been justified by reference to changing customer demands (Hortmann-Scholten, 2003). Obviously, slaughterhouses still trust in an efficient control of pork production through grading systems providing farmers with extrinsic rewards. So unless pork production may change dramatically due to the emergence of completely new and more difficult to measure quality attributes as a result of, for instance, the emergence of pork as functional food (Cloutier & Saives, 2002), a need for more intrinsic motivation in pork production is improbable.

Successful pork production employs a lot of explicit knowledge about production and marketing processes. This knowledge about, for instance, the development of pig prices or state-of-the-art disease treatment is often provided on an on-going basis by producer associations or publicly subsidized institutions. Pork production is strongly dependent on good animal health and above-average biological performances such as high daily weight gains and high feed conversion efficiency. Benchmarking often reveals that differences concerning animal health and biological performances between different farms remain stable over time. This indicates the relevance of a good deal of tacit knowledge in pork production which serves as a valuable, scarce, non-imitable and non-substitutable core competence (Barney, 1991) on the farm level.

Taking both aspects into consideration, we can hypothesize that knowledge-producing and knowledge-based teams are not an adequate organizational solution for pork production. Therefore, very close organizational relationships between pig producers on the one hand and

slaughterhouses on the other hand which allow the formation of teams are not necessary. Instead market relationships between farmers – acting as independent knowledge workers employing tacit knowledge about competitive pig production – and slaughterhouses can be expected to prevail from a motivation and knowledge-based perspective.

4 Farmers' Attitudes towards Contracts and Vertical Integration: Results of a Survey

The previous section provided some theoretical support for the model of a less integrated pork supply chain. An important but often neglected factor of choosing the right governance structure is farmers' acceptance of stricter coordinated chains, which is crucial at least for short-term changes. In Germany, the concentration ratio at the processor level is growing but with an overall number of 247 slaughterhouses there are still enough alternative buyers. The leading companies, Vion (20.3 % share of total slaughters), Toennies (17.0 %) and the cooperative Westfleisch e. G. (10.8 %) follow different sourcing strategies, although marketing strategies and served markets are similar:

While Westfleisch introduced marketing contracts in 2001, Toennies and Vion work with private livestock dealers and marketing cooperatives and only rarely with single farmers, too. Transportation is provided by these traders, too, whereas Westfleisch owns a logistics center. However, the "Bestschwein" contracts of Westfleisch do not go very far. There are several breedings allowed to farmers which only have to be evaluated positively in a certain test program, the same is for the feed. Thus, we state that these contracts only aim at ensuring a certain percentage of the quantities required. Before 2001, so called "cooperation contracts" were employed which were even less demanding.

Most of the remaining German slaughterhouses do not apply contracts neither, except for some farmer associations operating own slaughterhouses. This freedom of choosing alternative marketing channels and organizational forms is leading us to the assumption that their attitude has to be taken into account. Before presenting the results of an own survey, we briefly review the existing literature in the field of contracting behavior.

4.1 Research Framework

Farmers' contracting behavior has been researched by a number of economists. The contributions can be distinguished into econometric and behavioral approaches. The first category comprises studies modeling contract decisions as a function of structural variables, e.g. personal and farm characteristics, which are based on statistics about real contract behavior (Katchova & Miranda, 2004; Key & McBride, 2003; Key, 2004). Key (2004), for example, states that contracting is highly correlated with size of farms. Other variables explaining the adoption of marketing contracts are education, the use of advisory services and the use of marketing plans and futures (Katchova & Miranda, 2004, p. 101). All in all, the authors resume that adoption of contracting in the real world stands a little bit behind the theoretical advice.

There are only a few studies that apply behavioral approaches, thus addressing farmers' attitudes towards contracting (Guo *et al*, 2005) or contract attributes (Lajili *et al*, 1997; Roe *et al*, 2004). They work with stated preferences, typically in simulated experiments or surveys. Guo *et al* (2005, p. 12-13.) find evidence that Chinese farmers have a rather positive attitude

towards contracts, as 21.2 % out of 1,036 surveyed farmers already had contracts and another 76 % said that they would accept contracts if they were offered. According to these results, low participation in contract farming is mostly due to a lack of opportunity (52.2 %), interest of buyers (24.5 %) or obvious benefits (20.7 %). Lajily *et al* (1997) reveal that asset specificity and uncertainty influence farmers' preference for stricter contracts in line with TCE considerations. Boger (2001) argue that production contracts in the Polish pork market are applied as an instrument to establish high quality markets without appropriate grading systems.

The mainstream conclusion in agricultural economics is that contracts are a highly preferable option for farmers to reduce (price) risks and to safeguard specific investments. The main problem of farmers is not to be excluded from contractual relationships. From this viewpoint, the relevant question is whether contract farming bypasses small scale producers especially in developing countries.

According to Roe *et al* (2004, p. 123) in contrast, US farmers prefer contracts which are rather short term and include only minimum delivery requirements. Co-ops are preferred against private processors. Furesi *et al* (2006) reveal similar results for the contractual choice of Italian poultry farmers, which they investigate with regard to the processors' food safety strategies.

For Germany, anecdotic evidence shows that many farmers still strongly reject more vertical coordination of supply chains. In the German pork industry, for instance, "free entrepreneurs don't need contracts" is still a very popular slogan (AgraEurope, 2004). These findings imply some barriers to the adoption of stricter forms of governance by farmers, at least in developed markets, whereas in developing and transformational countries farmers might need contracts to get market access or have more price security. We suggest that farmers who are forced into contractual arrangements will show reactance, which leads to inefficiencies. Contracts based on persuasion and oppression thus are threatened by a low level of involvement and intrinsic motivation on the farmers' side.

Due to the lack of empirical studies about German pig producers' attitudes towards contracts, we conceptualized an own study. Our hypothesis is that it is a question of attitudes if pig producers engage in contracts or not. This is supported by the above mentioned citation from AgraEurope, which indicates that the attitude towards contracts is especially related to the fear to losing entrepreneurial freedom. For processors, this is important to know because of the previously discussed motivational implications which can be associated with emotional barriers against contracting.

However, a certain level of vertical coordination will be necessary in the future, at least in order to implement sector wide standards of Salmonella monitoring etc. Thus, it is important to scrutinize, if a strong rejection of contractual bonds is associated with an equally strong rejection of cooperation in general. If that was the case, contracts would probably be necessary for all processors, irrespective of the served market, be it standard mass or premium niche markets.

We thus distinguish two different aspects of vertical coordination, the attitudes towards contracts on the one hand and the general willingness to cooperate closer with a processor on the other.

The perception of structural bonds, which cause coercion to supply a certain slaughterhouse due to a lack of alternatives, might play a role for the farmers' attitudes, too. If there are no relevant marketing alternatives, a farmer might "accept his fate" and be more willing to cooperate or to engage in contracts, too. Such causality between attitude and behavior, postulating that behavior causes attitudes, can be explained by the theory of cognitive dissonance (Festinger 1957). According to Aronson (1968, p. 23) dissonance "is the result of cognitions inconsistent with the self-concept.". Thus, once the decision to engage in a contract has been made, a very positive attitude towards contracting is claimed in order not to contradict the own behavior.

Finally, there are some additional aspects we have to check with regard to their importance for contractual choice. Since we suggest that market access or availability of capital or inputs as driving forces for contracting reported from the studies in developing countries, do not represent problems in the German pig market, this is especially farmers' risk aversion. We assume that farmers might engage in contracts because they are more risk averse and need the secure surrounding of a contract to be able to concentrate on their production rather than on marketing questions.

4.2 Data and Empirical Methods

The survey was conducted among 357 large-scale pork producers in North-Western Germany, i.e. the Westfalen-Lippe and the Weser-Ems regions, the centres of German pork production, where many larger farms and slaughterhouses are sited. Interviews took place in the spring of 2005. In Table 2, the main characteristics of the sample are reported. Among the 357 interviewees, there are 17.1 % farmers who have contracts for all of their production, and another 1.7 % who have contracted their production only partially. Farm and herd sizes are far above German average.

Table 2: Sample Description (Mean Values)

	Total	Westfleisch	Toennies	Vion
Sample size	357	66	58	30
Farm size (ha)	93.24	88.43	94.04	95.53
Lease land (ha)	46.86	45.72	48.52	45.48
Herd size (feeder pigs)	1,406.38	1,220.76	1,088.98	1,976.33
Age of respondents (years)	40.80	40.50	41.91	40.03
% Weser-Ems	48.01	13.64	19.30	96.67
% Westfalen-Lippe	51.99	86.36	80.70	3.33
% Contractees	17.1	63.6	1.7	3.3
% Contractees (partial)	1.7	9.1	-	-
% Share of pig production in total farm income	61.3	60.9	64.6	63.4

In the sample we find 66 suppliers of Westfleisch, 58 of Toennies and 30 of Vion, which we assume to be sample sizes big enough to analyze separately, even if the results have to be interpreted with caution. Besides the already mentioned differences in contract use, the most important distinction is the regional distribution of the farmers: while 86 % of the Westfleisch and 81 % of the Toennies suppliers are situated in Westfalen-Lippe, there is only one of the Vion suppliers in this region, the main part is from the Weser-Ems region. Among the latter, we also find the highest average herd size, while farm sizes do not differ significantly. The high degree of specialization of the farms in our sample can be deduced from average shares of pig production in total farm income which farmers had to estimate in the survey.

According to our hypothesis, we investigate farmers' general attitudes and the perceived advantages of contracts, their willingness to collaborate and preferences for entrepreneurial freedom, and also their risk aversion, in order to identify reasons for differences in attitudes. The measurement is mostly based on seven point Likert scales ranging from "strongly disagree" (scale = -3) to "strongly agree" (scale = +3).

The next section first gives a short overview over attitudes of farmers towards contracts, long-term relationships and closer cooperation. Via correlation analysis, we also provide some first hints at the correctness of our hypotheses about relationships between different attitudes. The importance of socioeconomic characteristics is tested through correlation analysis, too. All correlations are listed in the appendix.

To test the hypothesis of differences in attitudes towards contracts and willingness to cooperate with the buyer, we carry out mean comparisons first between contractees and "free suppliers", and second between suppliers of the three biggest slaughterhouses who are subject to different forms of vertical coordination, as indicated above. Finally, we conduct a cluster analysis.

4.3 Results and Discussion

Attitudes towards Contracts and Cooperation with Buyers

The overall attitude towards contracts is measured through the statement "Contractual arrangements are only favorable for the slaughterhouses, farmers do not benefit from them at all.". Farmers tend to agree this point of view, but on average only slightly reject the item "Contracts provide me with more planning security." (see total average in Table 3), which stands as an example for perceived advantages of contracts. We also added two items concerning the necessity of own future contract use and the opinion about the best development for the whole sector. A slight but highly significant correlation between attitudes towards contracts and farm characteristics can be identified for the statement "In my opinion it would be better if farmers would engage in long-term contracts with slaughterhouses" and herd size ($r = -0.13^{***}$).

Despite the strong rejection of contracts, there is a clear willingness to cooperate more closely with a buyer, if the latter turns out to be a good business partner, which is shown by 42.5 % of farmers (strongly) agreeing and another 27.5 % rather agreeing to the statement. This willingness is positively correlated with the farmers' age and also with their attitude towards contracting.

In the previous section we already saw that the interviewees are mainly free suppliers. However, only 14.6 % of these say that they often or very often switch between the different processors available in their region; the great majority switches seldom (24.6 %) or rarely (46.6 %) their buyers. Thus we can assume that the degree of vertical coordination in the German pork production is quite low but that there is nevertheless a strong focus on long-term relationships.

To check whether this orientation is forced by structural bonds, which might exist in some regions, even if in Germany as a whole there are still a lot of slaughterhouses, we asked farmers, how they perceived the number of alternative buyers for their pigs. We can show that the frequency of buyer switching is positively correlated with this question ($r = 0.20^{**}$), but also negatively correlated with the item “My buyer relies on me as a supplier” ($r = -0.13^*$). From this we can conclude that the orientation towards long-term relationships is to some degree forced by market circumstances, but sometimes also in a mutual way, so that farmers do not necessarily suffer from one-sided dependence.

There is a slight correlation with the perception of structural bonds (number of marketing alternatives) – those who still have a high number of alternative buyers have a more negative attitude towards contracts (better planning: $r = -0.13^*$) and do not think that they will have to sign contracts even in the long run (-0.26^{***}).

There are only some correlations between the attitude towards contracts and socio-economic characteristics. The item “In the long run I will have to sign a contract in order to produce pigs profitably.” is correlated with age of the farm manager ($r = 0.11^*$). The age is also an important moderating variable concerning the preference for entrepreneurial freedom: the older the farmers, the less important is this aspect ($r = -0.15^{**}$). The item “I do not want to give up my entrepreneurial freedom due to contractual arrangements.” is also strongly related to the contracting attitudes.

Finally, farmers’ risk aversion does not seem to be very high, and decreases slightly when herd sizes grow ($r = -0.16^{***}$). The item “When making business decisions I prefer to play it safe.” is agreed with a mean of $\mu = 0.68$. Only 13 % disagree, 30 % answered with “partly”.

Comparison of Contractees and “Free” Suppliers

The mean comparisons presented in Table 3 reveal whether free suppliers are characterized through negative attitudes towards contracting and a low willingness to cooperate with their buyer. For the comparison of contractees and free suppliers, full and partial contracts are subsumed in the category contractees, due to the small number of partial contractees.

Answers of the two groups differ significantly as to general attitudes towards contracting (Table 3). The statement “contractual arrangements are only favorable for slaughterhouses, farmers do not benefit at all” is rejected by contract farmers whilst farmers without contracts clearly agree. Benefits of contracts in terms of enhanced planning are strongly recognized by contract farmers and rather neglected by the others. Non-contractees also strongly reject the item asking whether they think they will inevitably have to use contracts in the future, while contractees agreed.

Table 3: Contractees versus “Free” Suppliers: Mean Comparisons

Item	Total (354)	Contractees (67)	Free suppliers (287)	F (p)
	μ (σ)	μ (σ)	μ (σ)	
Contractual arrangements are only favorable for the slaughterhouses, farmers do not benefit from them at all.	0.56 (1.60)	-0.64 (1.55)	0.84 (1.47)	53.96 (0.00)
Contracts provide me with more planning security.	-0.23 (1.55)	0.96 (1.43)	-0.51 (1.44)	55.89 (0.00)
In the long run I will have to sign a contract to produce pigs profitably.	-0.88 (1.78)	0.78 (1.86)	-1.26 (1.53)	88.96 (0.00)
In my opinion it would be better if farmers engaged in long-term contracts with slaughterhouses.	-0.39 (1.60)	0.76 (1.40)	-0.66 (1.53)	48.37 (0.00)
I do not want to give up my entrepreneurial freedom due to contractual arrangements.	1.20 (1.58)	-0.09 (1.61)	1.50 (1.41)	64.86 (0.00)
I prefer cooperation with only one processor if he has turned out to be a good business partner.	1.05 (1.35)	1.46 (1.23)	0.95 (1.36)	7.82 (0.01)
I can imagine to collaborate more closely with [slaughterhouse XY].	0.13 (1.45)	0.54 (1.51)	0.03 (1.42)	6.72 (0.01)
I am willing to consider a slaughterhouses quality requirements in my production.	1.32 (0.91)	1.54 (0.75)	1.27 (0.94)	4.82 (0.03)
I won't let [slaughterhouse XY] influence the quality parameters of my production.	0.07 (1.45)	-0.16 (1.47)	0.12 (1.44)	2.13 (0.15)
When making business decisions I prefer to play it safe.	0.73 (1.14)	0.63 (1.22)	0.75 (1.12)	0.66 (0.42)
I have lots of different slaughterhouses I can deliver to.	0.68 (1.55)	0.19 (1.79)	0.79 (1.47)	8.29 (0.00)
In my region there are relatively few marketing alternatives.	-1.19 (1.49)	-0.85 (1.75)	-1.27 (1.41)	4.37 (0.04)

Note: Seven point Likert scales ranging from “strongly disagree” (scale = -3) to “strongly agree” (scale = +3)
Differences not significant at least at the 5 %-level are marked through bold type

The item “I do not want to give up my entrepreneurial freedom due to contractual arrangements.” is strongly agreed by free suppliers, but contract farmers only slightly reject it, showing that autonomy is important even for those who have engaged in contracts. Thus, it is questionable, if the farmers who stated a positive general attitude towards contracts would engage in stricter contracts than the Westfleisch contracts, which currently are not very demanding. All in all, contract farmers have a far more positive attitude towards contracts than free suppliers, who refuse contracts categorically.

There are also differences between contractees and independent farmers concerning general cooperation, but we can nevertheless state a willingness to cooperate with the buyer among the latter group, too. Furthermore, contractees and free suppliers show similar attitudes concerning the willingness to let the buyer influence quality parameters of the own production. From these findings we can conclude that the attitude towards contracts is somewhat detached from the willingness to cooperate. This offers the opportunity to keep current sourcing strategies notwithstanding future requirements of basic quality management.

The last task for this comparison is the look at risk aversion. Our hypothesis of higher risk aversion of contractees proves to be wrong, since in both groups nearly the same mean can be observed, which already could be expected due to the low overall standard deviation in the sample

Suppliers of Different Slaughterhouses: Attitudes towards Contracting and Cooperation

In the next step we repeat the previous analysis, this time comparing suppliers of different enterprises. Even if the number of suppliers is small especially for Vion, the comparison of means shows interesting differences between the respective farmers (Table 4). The Westfleisch suppliers are further divided into the categories contractees (W-C) and free (W-F), in order to control for the impact of the slaughterhouses' current marketing strategies. In the last column, the F-and p-values are reported to check for significant differences.

Table 4: Suppliers of Different Slaughterhouses: Mean Comparisons

Item	Total	W-C	W-F	T	V	F
	(154)	(48)	(18)	(58)	(30)	
	μ	μ	μ	μ	μ	(p)
	(σ)	(σ)	(σ)	(σ)	(σ)	
Contractual arrangements are only favorable for the slaughterhouses, farmers do not benefit from them at all.	0.40 (1.59)	-0.44 (1.67)	0.44 (1.38)	0.79 (1.36)	0.97 (1.50)	7.81 (0.00)
Contracts provide me with more planning security.	-0.14 (1.54)	0.79 (1.43)	-0.35 (1.32)	-0.72 (1.29)	-0.41 (1.62)	10.86 (0.00)
In the long run I will have to sign a contract to produce pigs profitably.	-0.62 (1.82)	0.71 (1.81)	-1.22 (1.63)	-1.24 (1.38)	-1.20 (1.63)	16.09 (0.00)
In my opinion it would be better if farmers engaged in long-term contracts with slaughterhouses.	-0.22 (1.58)	0.71 (1.54)	-0.06 (1.39)	-0.82 (1.32)	-0.67 (1.52)	11.01 (0.00)
I don't want to give up my entrepreneurial freedom due to contractual arrangements.	1.06 (1.52)	0.02 (1.66)	1.41 (1.37)	1.59 (1.08)	1.50 (1.33)	13.61 (0.00)
I prefer cooperation with only one processor if he has turned out to be a good business partner.	1.14 (1.23)	1.40 (1.23)	0.89 (1.37)	0.97 (1.08)	1.24 (1.41)	1.40 (0.24)
I can imagine to collaborate more closely with [slaughterhouse XY].	-0.01 (1.43)	0.46 (1.34)	0.11 (1.57)	-0.22 (1.27)	-0.43 (1.63)	3.19 (0.03)
I am willing to consider a slaughterhouses quality requirements in my production.	1.26 (0.88)	1.46 (0.77)	1.06 (0.73)	1.24 (0.78)	1.10 (1.24)	1.48 (0.22)
I won't let [slaughterhouse XY] influence the quality parameters of my production.	0.23 (1.45)	0.10 (1.45)	0.56 (1.50)	0.21 (1.36)	0.30 (1.60)	0.45 (0.72)
When making business decisions I prefer to play it safe.	0.68 (1.17)	0.67 (1.19)	0.72 (1.23)	0.53 (1.01)	0.93 (1.39)	0.77 (0.51)
I have lots of different slaughterhouses I can deliver to.	0.42 1.54	0.00 1.76	0.11 1.49	0.50 1.42	1.10 1.16	3.62 0.01
In my region there are relatively few marketing alternatives.	-0.83 1.58	-0.71 1.69	-0.47 1.59	-0.67 1.64	-1.53 1.07	2.64 0.05

Note: Seven point Likert scales ranging from "strongly disagree" (scale = -3) to "strongly agree" (scale = +3)

W-C = contractees of Westfleisch; W-F = free Westfleisch suppliers; T = Toennies; V = Vion

Differences not significant at least at the 5 %-level are marked through bold type.

The mean comparison reveals that the answers of free Westfleisch suppliers are much more similar to those of the other free suppliers than to the Westfleisch-contractees. In some cases, their answers deviate from both groups. Concerning the own future use of contracts, the free Westfleisch suppliers are on average irresolute, while contractees are sure they will have to use contracts in the future, and the other free suppliers strongly reject a future need for contracts.

A further look at the results reveals that there are no significant differences concerning willingness to cooperate with or to consider the buyers quality requirements. The suppliers of big slaughterhouses thus seem to have an even greater orientation towards cooperation with their buyer than farmers in general, even if the currently free suppliers strongly reject contracts.

It has to be investigated, why there is such a great attitudinal difference towards contracts between the groups compared, although the willingness to cooperate is quite high. The results so far support our hypothesis, that it is rather an emotional than an economic question, whether farmers will sign contracts. The very positive attitude towards contracts claimed by contractees might have two possible reasons.

First, the only slaughterhouse which is actually applying contracts to a noteworthy extent, the Westfleisch e. G., is a co-op, so that it can be assumed that there are stronger emotional ties and more trust between farmer and enterprise (Schulze *et al.*, 2006b; James & Sykuta, 2006). This might positively affect their willingness to engage in contracts, because there is still the possibility to influence the company's strategy. However, a look at the negative evaluation of contracts through the free Westfleisch suppliers shows that the fact of being a co-op alone does not attract farmers to contracts. Furthermore, even contract farmers do not have a general positive view of contracts as one could assume. One reason might be that farmers feel dependent on one specific buyer because of the regional structure or historical linkages to their coop.

Thus, we propose a second explanation based on the theory of cognitive dissonance (Festinger, 1957). One might think that those farmers, who entered into contracts because of a long-term tradition of the relationship and due to emotional ties, or also due to a lack of alternatives, as discussed above, now will not declare this decision to be wrong. In this case attitudes are influenced through behavior and not the other way around.

For the group of free suppliers, it seems that there really is a high emotional barrier, as though the simple mention of the word "contract" already aroused suspicion. However, in this field some more research is needed.

Still, high standard deviations show that there is no consensus amongst the farmers in either of the groups. All in all, attitudes towards contracts are much more complex and sceptical than has been recognized by scientists up to now. Neither farm size, nor age, nor willingness to take risks are correlated to these attitudes. Against the background of the high standard deviations it is not likely that all of the respective attitudes can be explained by current marketing strategies. Therefore, we conduct a cluster analysis to reveal homogenous groups of farmers.

Cluster Analysis

The cluster analysis was carried out based on 5 variables representing the most important statements towards contracting and cooperation with one preferred buyer respectively. Euclidian Distance serves as proximity measure. The optimal number of clusters is first defined using Ward method. A four cluster solution is chosen based on scree test, dendrogram and plausibility considerations. In order to refine this solution in a second step, a K-means cluster analysis is conducted.

Table 5: Cluster Analysis: Attitudes towards Contracting

Item	Total (343)	Cluster1 (103)	Cluster2 (85)	Cluster3 (82)	Cluster4 (73)	F (p)
	μ (σ)	μ (σ)	μ (σ)	μ (σ)	μ (σ)	
Contractual arrangements are only favorable for the slaughterhouses, farmers do not benefit from them at all. ¹	0.59 (1.57)	2.15 (0.86)	0.59 (1.00)	-0.04 (1.20)	-0.88 (1.34)	121.99 (0.00)
Contracts provide me with more planning security. ¹	-0.24 (1.54)	-1.75 (1.05)	-0.40 (0.89)	0.50 (1.18)	1.23 (1.07)	133.02 (0.00)
In the long run I will have to sign a contract to produce pigs profitably. ¹	-0.90 (1.77)	-2.51 (0.64)	-0.55 (1.09)	-1.59 (0.83)	1.73 (0.84)	375.20 (0.00)
In my opinion it would be better if farmers engaged in long-term contracts with slaughterhouses. ¹	-0.41 (1.58)	-2.07 (0.82)	-0.65 (1.01)	0.33 (1.03)	1.38 (0.81)	223.22 (0.00)
I do not want to give up my entrepreneurial freedom due to contractual arrangements. ¹	1.22 (1.55)	2.34 (1.02)	1.29 (1.12)	1.20 (1.28)	-0.41 (1.43)	74.36 (0.00)
I prefer cooperation with only one processor if he has turned out to be a good business partner.	1.08 (1.31)	0.81 (1.57)	0.12 (1.12)	1.65 (0.76)	1.95 (0.55)	44.67 (0.00)
I can imagine to collaborate more closely with [slaughterhouse XY].	0.12 (1.45)	-0.25 (1.46)	-0.09 (1.19)	0.19 (1.51)	0.84 (1.38)	9.60 (0.00)
I am willing to consider a slaughterhouses quality requirements in my production.	1.32 (0.91)	1.14 (1.12)	1.14 (0.87)	1.41 (0.70)	1.66 (0.73)	6.36 (0.00)
I won't let [slaughterhouse XY] influence the quality parameters of my production.	0.06 (1.44)	0.21 (1.66)	0.21 (1.19)	-0.07 (1.44)	-0.16 (1.39)	1.49 (0.22)
When making business decisions I prefer to play it safe.	0.74 (1.11)	0.76 (1.23)	0.72 (1.02)	0.70 (1.11)	0.79 (1.05)	0.13 (0.94)
I have lots of different slaughterhouses I can deliver to.	0.67 1.55	0.98 1.53	0.78 1.39	0.83 1.40	-0.07 1.70	7.76 0.00
In my region there are relatively few marketing alternatives.	-1.18 1.50	-1.41 1.52	-1.14 1.37	-1.28 1.33	-0.81 1.73	2.49 0.06

Note: Seven point Likert scales ranging from “strongly disagree” (scale = -3) to “strongly agree” (scale = +3)

¹ Cluster building variables

Differences not significant at least at the 5 %-level are marked through bold type.

In Table 5 clusters are described by means and standard deviations of the active (cluster building) variables as well as important passive variables. The four groups can be characterized as “inveterate antagonists”, “indifferent farmers“, “cooperation-oriented farmers” and “contract supporters“. As show the F-values, the strongest differences between

the clusters can be observed for the statements concerning the perceived necessity to contract with a slaughterhouse.

The rejection of contracting is very manifest for the first cluster (“antagonists”) which contains 103 farmers. Notwithstanding, respondents in this group show a certain disposition to build stable relationships with one slaughterhouse. In contrast to this the second cluster is indifferent towards vertical contracts but with a low willingness to engage in closer business relationships. Overall, these farmers are suitable to supply markets without higher specialties and production requirements.

Cluster 4 is the only group which perceives some farmer benefits from marketing contracts, especially assured market access and planning reliability. Nevertheless, the group’s positive attitude towards contracting is somewhat modest.

Clusters 2 and 3 are a little bit surprising. On the one hand, respondents in cluster 3 show a distinctive willingness to build closer relationships with their preferred customers; on the other hand, they perceive their market opportunities as sufficient with a lot of alternative slaughterhouses. Farmers in cluster 2 are quite indifferent but show the lowest degree of cooperative intentions. Furthermore, this group is characterized through a comparatively high switching behavior. Altogether the amount of trust and especially of commitment in the pork chain is rather low in all segments. Contract farmers show significant higher values but regarding their long-term and ongoing relationships a weak approval is not convincing.

A look at current contracting behavior of the cluster members shows that cluster 4 – the “contract supporters” – consists of 53.4 % contractees, whilst in the other clusters there are far less farmers with contracts, as could be expected. Put differently: 66 % of all contract farmers in our sample are members of cluster 4. Another 15 % belong to the group of the “cooperation-oriented farmers”, 14 % are in the group of “indifferent farmers”, and 5 % are “inveterate antagonists”. The other way around, one third of contract farmers do not show positive attitudes towards contracting. It is interesting to note that cross tabulations do not show significant differences between the clusters in terms of farm size (finishing capacities and hectares) and significant differences in the age of the farmers do not reflect a linear relationship. We assume, that these probably feel forced to engage in contracts. Regrettably, the size of this subsample is too small to conduct further analyses. However, the theory of cognitive dissonance can not fully be approved for the example of contracting in pig production.

All in all, we state strong negative attitudes towards contractual relationships, with more than two thirds of the respondents not willing to engage in contracts with their buyers. Nevertheless we state a broader willingness to cooperate more closely with processors if they in turn show cooperative behavior. The decision not to engage in contracts seems to be a very emotional one, as there are only few discriminative characteristics of contract supporters and antagonists.

5 Discussion and Conclusions

The question of vertical coordination is more complex than the often quoted simple spot market - contract - vertical integration trichotomy suggests. Neither theoretical considerations nor results of farmer surveys unquestionably favor one solution over all others. Instead, the

organization theories referred to above imply that certain contingency factors such as quality expectations and demands for traceability, but also available technologies such as RFID and improved carcass grading systems strongly influence the efficient organization of meat supply chains. Since different market segments will prevail even in developed countries, for instance a mass market for standard qualities with only basic quality and safety requirements besides several smaller but more differentiated market segments requiring above-average product or process qualities, we hypothesize that the search for a “one best way of organizing” food chains, let it be open markets, contracts, or vertical integration, is misdirected. Instead, we subscribe to the idea of equifinality which has been propelled in organization theory for several years.

The concept of equifinality has been popularized by the open social systems model proposed by Katz and Kahn (1966). The basic idea of equifinality is that organizations can reach the same final state from different initial conditions and by a variety of paths. Therefore, there is no one-to-one relationship between situations and organization designs: “In acknowledging that both environmental contexts and organizational designs are composed of multiple, partly conflicting dimensions, and that organizations pursue multiple, partly conflicting goals (March & Simon, 1958), we must correspondingly recognize that seldom, if ever, can a single optimal design be matched to a specific environmental context” (Sinha & Van de Ven, 2005). Equifinality, thus, means that there is more than one effective way to design firms or supply chains in a given environment (Gresov & Drazin, 1997).

If we compare farmers’ attitude towards contracting on the one hand and theoretical considerations on the other hand, congruent results can be observed. The degree of asset specificity and uncertainty is rather low in most market segments and a lot of farmers tend to protect their economic freedom which indicates a similar assessment of vertical coordination. Furthermore, decision-oriented and motivation and knowledge-based approaches in organization theory do not unanimously support the idea of stricter coordinated pork production chains.

All in all, our empirical results support the idea of equifinality, because we can show that considerable differences between farmers with and without contracts only exist in terms of this special attitude, and not concerning other attitudes or farm characteristics. There is a strong willingness to co-operate closer and to consider the buyers’ quality requirements even among the free suppliers, who mainly prefer stable, but non-constrained relationships. This leads us to the assumption that requirements for the standard market can easily be asserted in non-contractual relationships, if the slaughterhouses offer fair conditions of cooperation.

Taking both theoretical considerations and empirical results into account, we conclude that the coexistence of different ways of organizing meat supply chains can be expected even in the long run. Meat production is not a monolithic industry but is confronted with very diverse environmental conditions in different regions and market segments so that the efficient organization of meat supply chains may look very different dependent on the specific challenges they face. But the concept of equifinality teaches that even in very similar situations different organizational solutions can be equally effective. Therefore, the Danish and the US industries are undoubtedly on the best performance frontier. Nevertheless, they cannot be presented as blueprints for the rest of the world, as is sometimes done. A general trend towards more contracts and vertical integration in the world’s meat supply chains is, thus, somewhat unlikely. Instead we will witness the on-going competition between differently organized meat supply chains in more and more globalized meat markets.

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Appendix: Bivariate Correlations

		age	income share	acreage	herd size	contr1	contr2	contr3	contr4	free	coll1	coll2	coll3	coll4	risk	bonds1
income share	r	-0.09	1.00													
	p	0.10														
acreage	r	-0.02	0.03	1.00												
	p	0.64	0.60													
herd size	r	-0.01	0.31	0.47	1.00											
	p	0.78	0.00	0.00												
contr1	r	0.06	0.10	-0.04	0.08	1.00										
	p	0.26	0.06	0.47	0.12											
contr2	r	0.05	-0.09	0.07	-0.08	-0.57	1.00									
	p	0.32	0.09	0.22	0.14	0.00										
contr3	r	0.11	-0.02	0.01	-0.07	-0.58	0.56	1.00								
	p	0.05	0.68	0.90	0.18	0.00	0.00									
contr4	r	0.09	-0.07	0.05	-0.13	-0.60	0.59	0.65	1.00							
	p	0.10	0.22	0.33	0.01	0.00	0.00	0.00								
free	r	-0.15	0.03	-0.04	0.07	0.58	-0.53	-0.68	-0.58	1.00						
	p	0.01	0.58	0.48	0.18	0.00	0.00	0.00	0.00							
coll1	r	-0.02	0.01	0.00	-0.10	-0.17	0.26	0.19	0.28	-0.15	1.00					
	p	0.66	0.83	0.96	0.07	0.00	0.00	0.00	0.00	0.00						
coll2	r	0.16	0.05	0.05	-0.02	-0.21	0.20	0.23	0.25	-0.16	0.16	1.00				
	p	0.00	0.37	0.33	0.74	0.00	0.00	0.00	0.00	0.00	0.00					
coll3	r	0.21	-0.03	0.07	0.08	-0.14	0.18	0.20	0.15	-0.17	0.14	0.28	1.00			
	p	0.00	0.60	0.21	0.11	0.01	0.00	0.00	0.00	0.00	0.01	0.00				
coll4	r	-0.10	0.00	-0.05	-0.06	0.20	-0.13	-0.13	-0.09	0.16	0.05	-0.04	-0.11	1.00		
	p	0.05	0.93	0.39	0.25	0.00	0.02	0.01	0.08	0.00	0.33	0.44	0.04			

		age	income share	acreage	herd size	contr1	contr2	contr3	contr4	free	coll1	coll2	coll3	coll4	risk	bonds1
risk	r	0.06	-0.10	-0.01	-0.10	0.02	0.11	0.01	0.02	0.06	0.01	0.10	0.08	0.09	1.00	
	p	0.28	0.07	0.84	0.07	0.70	0.04	0.79	0.65	0.25	0.86	0.07	0.13	0.09		
bonds1	r	-0.13	0.05	-0.08	0.11	0.13	-0.12	-0.26	-0.21	0.27	-0.19	-0.12	-0.03	0.02	0.08	1.00
	p	0.02	0.38	0.12	0.03	0.01	0.02	0.00	0.00	0.00	0.00	0.02	0.60	0.75	0.11	
bonds2	r	0.21	-0.17	0.07	-0.13	-0.05	0.10	0.12	0.10	-0.16	0.10	0.02	0.01	0.01	-0.01	-0.46
	p	0.00	0.00	0.16	0.02	0.40	0.05	0.02	0.07	0.00	0.05	0.71	0.81	0.88	0.80	0.00

List of statements

Contr1	Contractual arrangements are only favourable for slaughterhouses, farmers do not profit at all.
Contr2	With a contract I can better plan my production.
Contr3	In the long run I will have to sign a contract to produce pigs profitably.
Contr4	In my opinion it would be better if farmers entered long-term contracts with slaughterhouses.
Free	I do not want to give up my entrepreneurial freedom due to contractual arrangements.
Coll1	I prefer working together with only one slaughterhouse if it turns out to be a good partner.
Coll2	I can imagine to collaborate more closely with XY.
Coll3	I am willing to consider a slaughterhouses quality requirements in my production.
Coll4	I won't let XY influence the quality parameters of my production.
Risk	When making business decisions I prefer to make it safe.
Bonds1	I have lots of different slaughterhouses I can deliver to.
Bonds2	In my region there are relatively few marketing alternatives.