Food safety, hybrid structures and preferences for contractual rules: theory and evidence from the Italian poultry sector

Gaetano Martino[1], **Paolo Polinori**[2]

[1]*Department of Agricultural Economics, Rural Appraisal and Food Sciences, University of Perugia, Borgo XX Giugno, 74, 06121 - Perugia Italy, (Corresponding author: phone +39075-5857135; fax +39075-5857146; e-mail: martinog@unipg.it*

[2]*Department of Economics, Finance and Statistics, University of Perugia, Via Pascoli 15, 0612, Perugia, Italy;(phone: +39075-5855002; fax: +39075-5855299; e-mail: polpa@unipg.it)*

INTRODUCTION

The study considers the relationship between food safety strategies, technology and organizational choices in Agri-Food chains. Food safety strategies entail a necessary relation between technology and organization, with a relevant role for coordinating mechanisms. In the field of safety the necessity for coordination arises due to the fact that mistakes, outbreaks and unforeseen contingencies may occur at any stage of the food chain, and are likely to influence the final outcome because of the interdependency of the productive tasks in the input-output relationships. Both organizational and technological choices contribute to the safety results expected, while the institutional arrangements the agents decided upon contributes to the effectiveness of the technology.

Scholars show that hybrid forms of governance are chosen by the agents in order to reach safety objectives**.** Fulponi (2006) emphasizes the relation between the

attempt to preserve a company's reputation from being marred by a safety accident, and organizational choices. Similarly, Réviron and Chappuis (2005) identify a link between the necessity of managing the 'risk of losing reputation' and the choice hybrid organizational forms. Mazè (2002) illustrates the relationships between quality strategies and organizational choices, and emphasizes the role of hybrid structures. Martino and Perugini (2006), stressing the role of information asymmetry and the risk of opportunism, have proposed a conceptualization of the relation between the choice of hybrid structures and that of food safety strategies. Safety objectives tend to increase the mutual dependency of the agents along a supply chain and, promoting the diffusion of hybrid governance structure (Mènard and Valceschini 2005), emphasize the role of contractual relationships. We aim at contributing to this literature in the context of Transaction Cost Economics (TCE). The first objective of the paper is to elaborate on the relationship between safety- oriented technology and organization in hybrid forms, in terms of contractual rules. In particular, we argue that the coordination decisions implement the safety- oriented technology in hybrid forms and that, given the contractual basis of the hybrid forms (Mènard 2004), the specification of technology and of productive tasks also depends on the decisions relating to the contractual rules. In this context potential maladapation costs may arise which influence the effectiveness of the coordinating devices designed to achieve the safety degree expected.

The second objective of the study is thus to provide empirical evidence of the relationship between technology and organizational choices. This poses two different problems. Firstly, the parties' interest for minimizing transaction costs can be expressed in terms of the preference for contractual rules (Brosseau and Raynaud

2006). Therefore the analysis takes into consideration the concept of preferences in TCE, assuming that the preference for a given rule (relating to a given productive task) is determined by expectations about transformation costs and transaction costs. Secondly, the relation between technology and organizational choices entails both transformation and transaction costs, therefore even though we present estimates of maladapation costs, we do not provide a comprehensive estimating method.

The poultry sector provides an insightful example to illustrate and to investigate the topic depicted. Specific safety risks are in fact faced by agents, requiring complex technical solutions to be taken into account in organizational agreements. In the case of vertically integrated stages, a firm can directly plan and manage the process, but in the case of hybrid forms the specification is carried out within a contracting framework. Though in several countries most poultry production is carried out by vertically integrated companies, frequently a large percentage is also governed by contractual relationships involving a large number of growers (Martinez 1999). Vukina (2001) argues that the possibilities for chain agents of benefiting from technological change are among the reasons for contracting in the poultry sector. The issues posited by the food safety strategies seem to suggest this view be widened, and that we investigate how efficiently the agents coordinate their technological decisions.

The paper is organized as follows. The following section provides the "Analytical framework". The elaboration on the relation between technology and organization is presented in the section "Technology and organization". Firstly the relation between technology and organization is presented in the subsection "Coordination and technological choices", and the idea of technology implementation through contractual rule is proposed in the section "The implementation of safety-

oriented technology in hybrid structures". The potential influence of the maladaptation costs is analyzed in the section "The potential maladaptation costs of coordinating technological choices". The conceptual basis of the empirical investigation -the concept of preferences and their role- are discussed in the sections "Preferences in the context of Transaction Cost Economics" and "Preferences and cost of maladaptation", while the analysis of the poultry sector is presented in the section "Conceptual elements of the contract in the poultry sector". The next section "Methodology of the empirical analysis" describes the methodology which is based on a Choice Experiment carried out on a sample of growers and focused on contractual terms in the Italian poultry sector. The empirical results are presented in the section "Empirical findings". They suggest that, according to the existing literature, growers are interested in collaborating with the processor rather than increasing their degree of autonomy. Furthermore, the estimates of WTA and WTP for contractual rules provide, to some extent, estimates of the maladaptation costs and, therefore, information about the adaptation and the possibilities of implementing technology by drawing up contracts. The "Discussion" section summarizes the results while the last section proposes the conclusions. Having identified a relation between technology and organization, the main conclusion of the study is that the safety outcomes also depend on how the parties deal with the costs of adaptation due to technological contractual rules. The empirical analysis corroborates this theoretical proposition and suggests that as the technology implementation deals with the domain of action of a coordinated party, the costs of adaptation are likely to become influential on the safety-oriented technology.

ANALYTICAL FRAMEWORK

Technology and Organization

The food safety strategies entail a necessary relation between technology and organization, with a role for the coordination mechanisms. The technological requirements are concerned with the very nature of the safety goals and allow the agents to cope with basic issues emerging in several fields of the Agri-Food production processes. Scholars have also showed that to a large extent safety outcomes are predicated on the organizational choice along the chains (Mènard and Valceschini 2005). Food safety, relating credence and experience characteristics, requires the management of information asymmetry and the coordination of all the agents along the chains. Both raw materials and processes characteristics have to be chosen in order to satisfy standards and best practices and to support the achievement of food safety objectives. The strategy thus poses the basic organizational problem of choosing the governance structure which minimizes the transaction costs and allows agents to supply safe foods (Martino and Perugini 2006). On the other hand, technology plays a role with respect to safety objectives and the focus on the characteristics of the final product means technology must be considered along the whole supply chain. Figure 1 highlights the fact that safety-oriented technology implementation depends on the choices within vertically integrated firms as well as on the arrangements between the parties in the remaining governance structures.

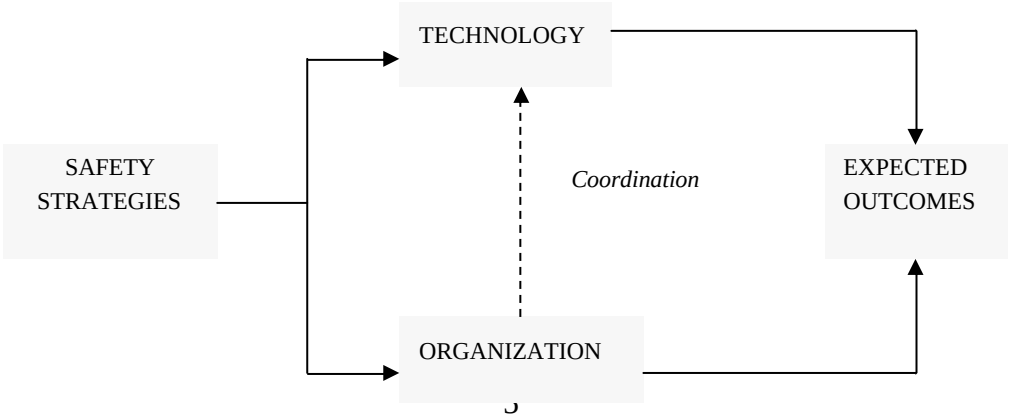


Figure 1. Organization and technology relationship in the context of food safety strategies

The necessity of technology coordination means that the appropriate technology adopted by a transaction party must be combined with the appropriate technology adopted by the counterpart. This reflects the TCE statement that technology and organization are jointly chosen (Williamson, 1985). In other words, the arrangements set in order to shape the technological choices are a critical part of the organizational strategies of the agents, implying a link between the organizational choices and the technology adopted.

Coordination and Technological Choices

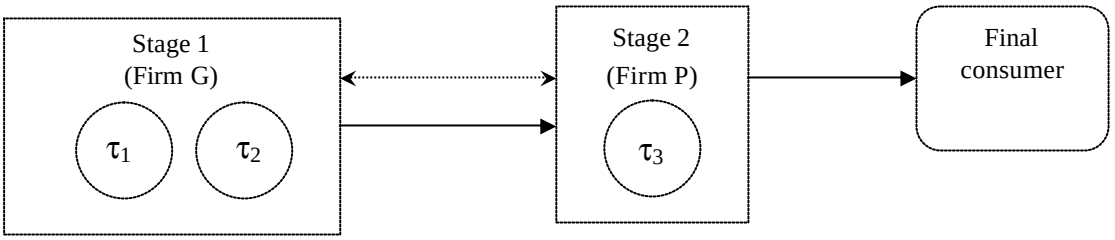
Food safety necessitates an accurate specification of the technology and that the productive tasks be carried out. Governance structures can be observed in Agri-Food Chains, and they vary depending on a several factors influencing the costs of the exchanges,. As a consequence the productive process may take place within a single vertically integrated firm or within several stages coordinated by spot markets or hybrid firms. As all the agents along the supply chains jointly contribute to the final product's degree of safety, it would seem necessary to accept the idea that the implementation of safety-oriented technology also depends on the governance choice. In order to illustrate this proposition we propose the following example.

For the sake of simplicity, let's assume that a safety strategy conceived by processor P requires just three productive tasks to be carried out, say τ_1, τ_2 and τ_3, and imagine that there are the three basic governance structures of the chain, with the consumer at the end. We consider the domain of action of each party as the field within which the party is free to act as he/she decides. This domain could vary with the governance structure. Assuming that the three tasks are carried out within two

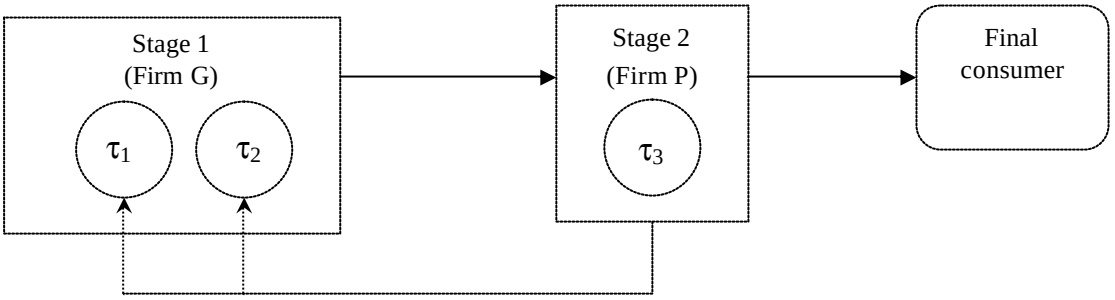
stages, Figure 2 illustrates how the productive coordination of the tasks may vary with the governance structure. In the case of the market (case a) the tasks are managed by two different firms: firm G (e.g., grower) manages stage 1 (performing tasks τ_1 and τ_2) and firm P manages stage 2 (task τ_3). The output of stage 1 is the input of stage 2, and its characteristics could affect the final output and its safety degree. The domain of action of firm G concerns tasks τ_1 and τ_2, whereas firm P carries task τ_3 out freely.

The case of hybrid governance (case b) is more complex. The authority is the mechanism of coordination (Mènard 1996; 1994): given the possibility that the degree of the final output depends on the characteristics of the intermediate product, firm P aims to coordinate the production process in stage 1 relying on its authority[1]. The expectations of processor P regarding the G performance concerns the possibilities of establishing a viable coordination among the parties. For instance, if τ_1 relates to an animal feeding practice which could be carried out in two different ways -say (τ_1)' and (τ_1)''-, entailing different uses of resources-, due to consumer expectations, processor P could be only interested in (τ_1)'. In the broad situation depicted in figure 2, the processor aims at inducing firm G to carry out (τ_1)' according to the safety requirements. The chances of processor P's success depend on what chances of coordinating the technological choices are provided by the governance structure. The implementation of technology in stage G could be directed by firm P (this is the meaning of the dotted line in figure 2). For example, P may negotiate the adoption of a production protocol by G. Firm G is still able to operate freely with regard to the tasks, but its domain of action appears to be restricted to τ_2 as a consequence of the

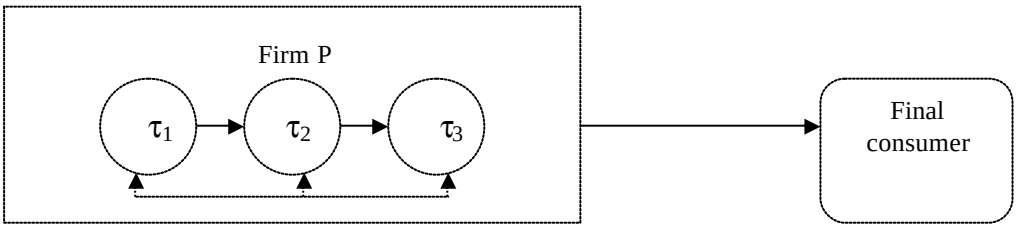
authority of firm P (Mènard 1994). There is a further, authoritative way by which P could influence the technical choices of G.



a) Market



b) Hybrid structure



c) Vertical integration

Legend: Input-output relations: ⟶ Coordination: ⋯⟶

Figure 2. Technology implementation – Examples in different governance structures

We would suggest that P could manage the situation described according to an authoritative approach by restricting the domain of action (ban on carrying out (τ_1)') or by modifying the preferences of G (e.g., by training activity emphasizing (τ_1)''). Both of these possibilities are described by Mènard (1994). In both cases, P could also induce G to accept a contractual rule by providing compensation.

The approach described may be followed for both τ_1 and τ_2 as suggested by figure 2. The third case in Figure 2, vertical integration, is characterized by the coexistence of all three tasks within the domain of action of P. In this case the hierarchy allows the firm to manage and to carry out the tasks in its interests.

In the case of the hybrid structure, the nexus between the coordinating mechanism (authority) and the domain of action is straightforward. Our analysis focuses on this relation and will consider the issues arising because of the effects on safety of each task to be coordinated in the production processes along the chain.

The causal relation between coordination and technology implementation has been widely investigated by economic theorists and analysts. The Smithian argument about the division of labour shows how the connection between technology and coordination sustains the specialization process. Agency theory and TCE approach the issue from different but often complementary points of view. A general principle which explains why the coordinating efforts of the processor have a chance of success in hybrid organizations relying on authority (Mènard 1994; 1996) has been stated by Simon (1991), who pointed out that organizations coordinate agents through authority, mainly by setting standards and norms allowing the agents to form more stable expectations with respect to the environment. As the agency theory has proved (Knoeber 1989), incentives and risk sharing play a prominent role in this context,

though incentives tend to be less effective than in a spot market relation (Williamson 1996), while -as emphasized above- uncertainty strongly influences the safety choices of both transaction parties. The focus on hybrid forms makes the contractual nature of some stages of technology implementation evident. Because of the interplay between legal autonomy and interdependency (Mènard 2004), the interest of the parties involved in a hybrid structure still focuses on the minimization of the transaction costs. According to Brosseau and Raynaud (2006) this interest can be related to the parties' preferences. As a consequence, both authority and preferences shape the coordination process of implementing technology. We develop these aspects in the section "Conceptual elements of the contract in the poultry sector" focusing on the notion of the domain of action of the parties as a central element of the contractual framework under a TCE approach (Mènard 1994; Brosseau and Glachant 2002).

The Implementation of Safety-oriented Technology in the Hybrid Structures

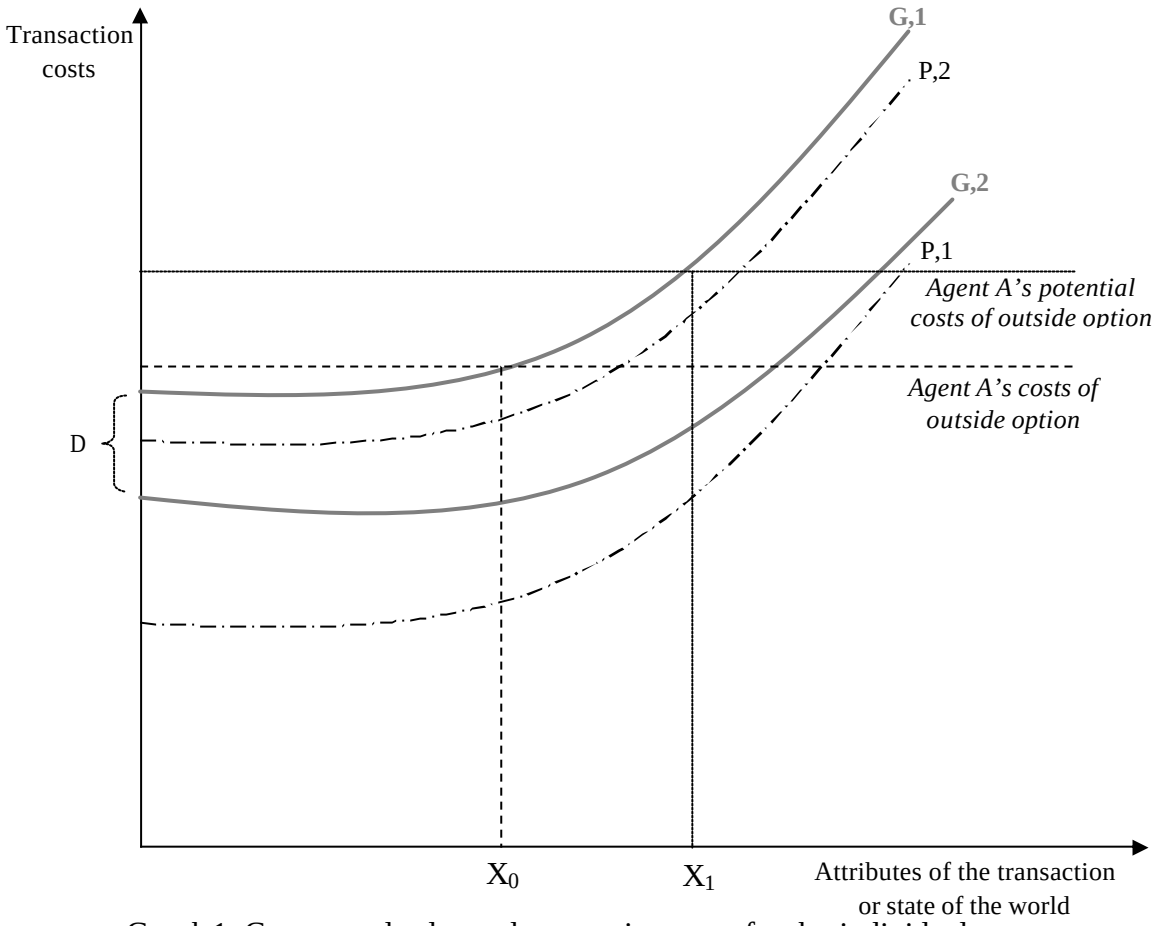
Technology implementation brings up the question of rights over the use of resources. In the case of hybrids illustrated above the assignment of a technical task through authority can be thought of as being incisive on this right over the use of a resource. This right is considered as a contractual rule within the arrangement between P and G. To develop our argument we restrict the attention to the contractual rules which entail decision rights about the use of resources. For instance, the assignment of a set of hygienic or feeding practices requires the grower to use labor and specific input according to the new tasks. The implementation of the technological tasks is performed with specific contractual rules, not only in the case of spot market (case a) but also of hybrids (case b), as a consequence of the contracting base of the hybrid

forms (Mènard 2004). The technological oriented contracting rules can determine variation in both transformation and transaction costs[2], but their adoption can be thought of as a step of organizational adaptation.

In contracting, a party oriented to given objectives has to meet the economic interests of the other party. Agents are interested in minimizing transaction costs and prefer contractual arrangements which minimize these costs. The safety strategy requires specific coordination among the agents of a food chain (Mènard and Valceschini 2005; Fulponi, 2006; Martino and Perugini 2006). Hence the contractual preferences of the agents may influence the safety degree of the product delivered to the consumers. Our analysis then shows that the relation between technology and organization is based on the governance structure and can take a form which is related to the coordinating mechanisms. The premise of this proposition is that a party to a transaction is interested in engaging the counterparty in a specific configuration of coordination of productive tasks. Food safety strategies determine the emergence of this kind of interest. The food safety strategies could determine an increase of transaction costs due to divergence of preferences for contracting rules. These costs take the form of maladaptation costs (Brosseau and Raynaud, 2006) and accrue the transaction costs determined by public and private strategic decisions (Hobbs, 2004).

There are four types of possible costs a party may bear for a contracting rule: bargaining and decision costs, and supervision and enforcement costs (Furubotn and Richter 2001, 45). The former two are not likely to occur in the case of less complex contracting, but, for example, a grower could face measurement costs related to the difficulty of ascertaining product quality in terms of the effects of the practices carried out. Measurement and enforcement costs could also arise which relate to the

quantitative characteristics of the input provided by the processor. The rules are concerned with the necessity of coordinating the productive tasks but interests of the parties concern to the transaction costs a party would have to bear adopting a given rule. According to Brosseau and Raynaud (2006) the transaction costs for each rule varies with the transaction attribute or the state of the world. Graph 1 illustrates the transaction costs relating to two different contractual rules (say, 1 and 2) for two firms along the chain, e.g. a grower (G) and a processor (P). We assume that the parties are engaged in a hybrid structure and that they are setting a specific contractual rule. A contractual rules ordering expresses the preferences of a party: the ordering of the grower differs from the ordering of the processor who could adopt different strategies in order to promote the adoption of the rule preferred (rule 2). Food safety strategies require specific investments related to monitoring activities, selection of suppliers, certification, signalling and so forth. These investments accrue the mutual dependence of the parties and influence their contractual choices. Williamson (1991) shows that uncertainty plays a prominent role in determining an increase in the transaction costs, given the degree of asset specificity, and contributes to inducing the agents to choose a given governance structure: our focus on hybrids does not exclude the influence of uncertainty in the choice of contractual rule. Until the attribute of the transaction, e.g. the asset specificity, rests within the value X_0, G cannot exploit any outside option (Muthoo 2002), as the related transaction costs are higher than the costs related to rule 1: so in the range 0- X_0, as G prefers (1,2) and P prefers (2,1), the rule adopted will depend on the contractual process. In the range X_0-X_1, G bears transaction costs for adopting rule 1 (preferred by P) larger than the cost he would bear exiting the trading relation.



Graph 1. Contractual rules and transaction costs for the individual agents (Brosseau and Raynaud 2006)

After level X_1, an increase of the outside option costs becomes significant. The processor may determine the increase in searching and contracting costs for a different relation (e.g., with a different processing company).

For instance, physical investments of the processor could be geographically localized and this site specificity may support his activities in the area. As a consequence it could be costly for a grower to connect with another company located in a different area. Furthermore, the long-term implicit relationship tends to shape the organization of the grower and change would also imply the cost of transforming the organization. Finally, search costs may only be increased by the structure of the final markets, and this determines the emerging of clusters of suppliers (growers)[3].

The change in the outside option costs influences G's behavior. Actually in the range X_0-X_1, G faces outside costs larger than the costs for adopting rule 1. In other words, this manoeuvre of firm P increases the range in which the possibility exists of forcing or compensating the grower.

The Potential Maladaption Costs of Coordinating Technological Choices

Given that asset specificity requires cooperative responses to disturbances, Williamson (1996, 110-ff.) considers the efficacy with which different modes (i.e, market, hybrid, hierarchy) implement adaptations. Maladaptation costs are thus defined with respect to the adaptation mode relative to asset specificity. Brosseau and Raynaud (2006) conceptualize the maladaptation costs in terms of the potential discrepancy between collective rules and individual coordination rules. Namely, they point out that agents not only assess and try to save the costs for measuring and

enforcing rights of use over resources, but also consider the agreements on the reorganization and transfer of these rights (Brosseau and Raynaud 2006, 10).

Food safety related technological tasks implicate rights of using resources, posing the problem of identifying the appropriate coordination rules within a contractual approach. Reciprocal commitments between the parties imply the choice of contractual terms concerning the rights of using resources. This shows a connection between the efficiency of the hybrid contractual framework and the outcomes in terms of food safety strategies. Yvrand-Billon and Saussier (2004) review the 'misalignment hypothesis' which refers to the relationship between the deviation from TCE principles and the performance of a governance structure. At any rate, the focus here remains on the problem of the choice of the contractual rules, provided that the agents are interested in a given level of safety and quality. The study does not go into details about the performance of the contractual choices, but concentrates on the attempts the parties make to optimize the alignment (Mènard 2004) and assumes that the alignment achieved and the enforcement procedures (Mènard 2002) are able to guarantee the outcomes expected.

The maladaptation costs can be seen in Graph 1. Accepting rule 2, G would bear the maladaptation costs Δ (difference between the costs of choosing rule 2 with respect to rule 1). In this simple case, G may be forced by the bargaining power of P to accept rule 2 ,or alternatively, if it was not costly, he may be compensated for accepting 2 (Brosseau and Raynaud 2006). In both cases rule 2 will be adopted –e.g., a new hygienic set of practices– which ensures the achievement of the strategic safety goal of P.

In summarizing this part of the analysis, we would suggest that potential maladaptation costs may arise which affect the possibilities of coordinating the activities to achieve the safety degree expected. The influence is due to the fact that the adoption of a rule which is not preferred causes the necessity of managing the emerging costs. If the parties succeed in this management the rule adopted contributes to the achievement of the safety objective. Alternatively, the rule will not be adopted or the relation between the parties may be questioned.

In the section "Preferences and maladaptation costs" we suggest that the management of the potential maladaptation costs imply their distribution between the parties. In order to develop the analysis we firstly consider the concept of preferences in TCE; then we again examine the relation between the contractual rules and the maladaptation costs from a qualitative point of view.

Preferences in the Context of Transaction Cost Economics

The axiomatization of TCE does not include preferences as a necessary concept. On the other hand, preferences are implied in TCE at least under three different points of view: a) the three level schema of Williamson (1996, 223) considers a role for preferences, even though he does this to point out that preferences endogeneity is not the focus of TCE; b) preferences are at the core of the nexus between the search for minimizing transaction costs and the choice of contractual rules (Brosseau and Raynaud 2006); c) preferences are considered by Mènard (1994; 1996) in the analysis of the authority in hybrid structures.

Williamson provides a three level schema showing that the individual level influences the governance structure level through behavioral attributes (bounded

rationality and opportunism), and emphasizing the potential influence of governance structure and environment upon individual preferences (Williamson 1996, 223). Bounded rationality induces the agents to search for structures which facilitate gapfills, while the risk of opportunism determines the attempts to select parties who reliably fulfil their promises and to specify and negotiate *ex post* safeguards (Williamson 1996, 57). Thus the contractual terms are primarily intended to render such a structure operational: agents try to economize on transaction costs, given the attributes of the transaction at stake (Williamson 1996), hence they make attempts to identify the best mechanisms for optimizing alignment of transactions to the governance structure by monitoring the organization and the search for solutions to emerging questions (Mènard 2004). Each party to a transaction has individual preferences about the 'contract of the feasible set', namely regarding the search for governance structure, the selection of a party and the specification of *ex post* safeguards. These preferences are related to the attempt to economize on transaction costs. Facing the emerging questions, the preferences may shape the parties' search for opportunities to optimize the alignment of transactions (Mènard 2004) and for the possibility of facilitating coordination (Mènard 1994). From this point of view, individual preferences could guide a party in selecting "feasible" contractual terms.

Brosseau and Raynaud (2006) connect preferences to the individual interest in attempting to minimize transaction costs. The transaction costs for each rule varies with the transaction attributes, an individual agent can choose the contractual rule which minimizes his transaction costs and is able to identify an ordering of the contractual rules at stake. Hence he could face different circumstances depending upon whether or not the counterpart has the same ordering of contractual rules.

Mènard (1994) points out the influence of governance structure on individual preferences. In the hybrid structure the authority facilitates the coordination by influencing the choices available to each members: individual preferences appear to be a field of potential influence supporting an efficient coordination (Ménard 1996). The contracting basis of the hybrid implies that a party authority facilitates coordination by altering the set of possible choices available to a grower (Ménard 1994), a) delineating the domain of action of members; b) influencing the conditions in which choices can be made; c) inducing members to change their plan and modifying their preferences (Ménard 1994, 236). Inasmuch as the preferences of a party express his interest in minimizing transaction costs, and so relate to the attributes of the transaction, this interest constrain the field of action of the authority. Preferences may be slightly modified in a long term relationship as a party may find it convenient to shape his productive organization in order to meet the stable standards identified by another party. Dealing with a new production organization could induce a new ordering of potential contractual rule, determined, for instance, by a new necessity to monitor.

Preferences and Maladaptation Costs

The contract allows the parties to support their food safety strategies as it allows them to minimize the transaction costs they face. Nonetheless, how the parties are able to minimize transaction costs depends on what contractual rules are adopted within the hybrid contractual framework. The consequences of the choices vary according to the relative orderings of contractual rules. Assuming that two agents (i.e., a grower and an integrator company) are dealing with two different rules, we may conjecture the

alternatives illustrated in Figure 3. The rights over the grower's use of resources are specified through contractual rules. A firm may consider some rules compulsory in order to implement the technology expected. These compulsory rules are integrated with the voluntary choice of the counterpart (see Figure 2, case b). The question then is how the compulsory rules are established within the contracting framework. If the rules orderings are the same for the grower and the integrator firm, an efficient choice will easily be made. Alternatively, one of the parties will bear maladaptation costs: compensation could be provided by a party inducing the counterpart to adopt the rule not preferred , or the former may force the adoption through his own bargaining power. It is easy to see that in both cases the maladaptation costs are caused by only one party, because of his/her preferences ordering. Nevertheless the costs are borne by one party or by the other, depending upon the cost of specifying and implementing the compensation and upon the bargaining power of the forcing party. Therefore, so far our argument can be summarized as follows. The specification and the implementation of safety-oriented technology is predicated on coordination and on the extent of the domain of action of the parties. In the case of a hybrid structure the implementation implicates preferences for contractual rule and, as a consequence, maladaptation costs may arise due to differences in the orderings of the parties. In TCE we justify the focus of preferences. Finally, the influence of the maladaptation costs is examined within the framework of the orderings of the preferences.

We then apply the analytical framework introduced to the case of the poultry contract. Firstly some conceptual elements are summarized and then an empirical analysis is presented which proposes estimates of the maladaptation costs and is aimed at corroborating the analytical propositions.

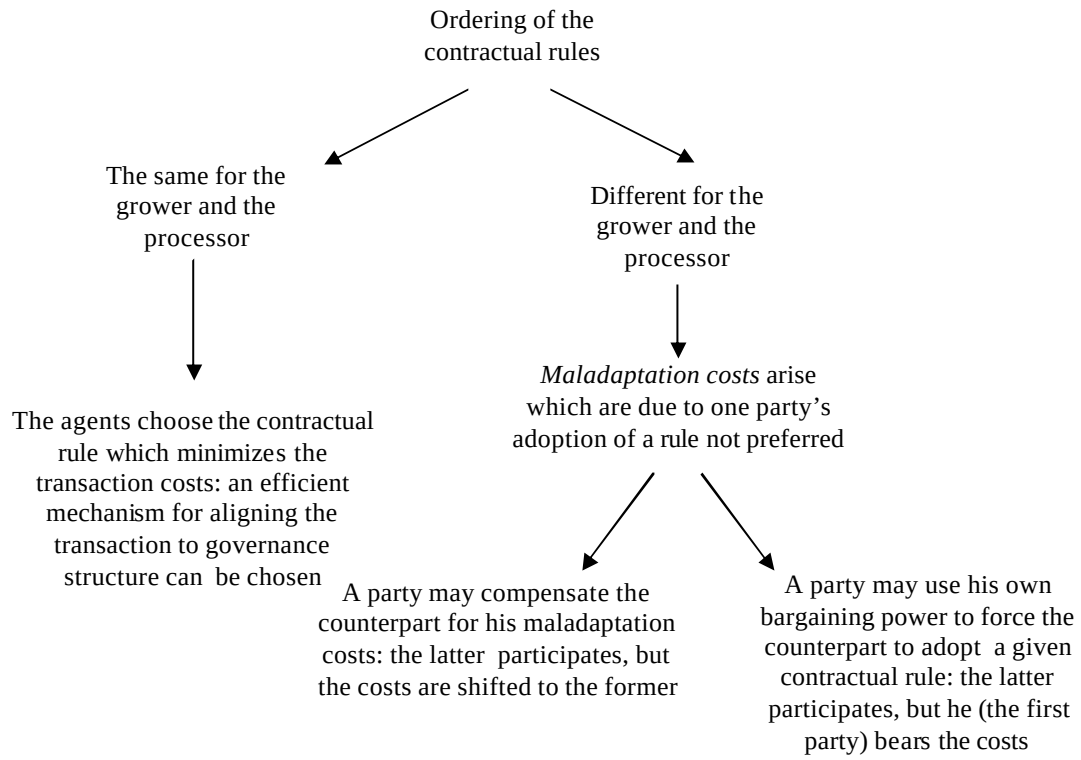


Figure 3. Orderings of contractual rules and maladaptation costs

CONCEPTUAL ELEMENTS OF THE CONTRACT IN THE POULTRY SECTOR

The broilers contract illustrates meaningful aspects. The integrator firm provides animals, feed, medicine and advice to contract growers. Growers provide housing, utilities, labor and management and raise the animals which are owned by the integrator (Knoeber 2000, 1133-1134). According to the criteria introduced by Valceschini et al. (2005), the governance structure of the critical transaction between growers and processing company is usually a hybrid structure based on relationships with qualified 'suppliers' (the growers). Contracts establish a complex set of technological, economic and financial rules. Goodhue (2000) and Vukina (2001) suggest that the grower investment in specific assets (i.e. houses) can be thought of as an indicator of agents' ability. Mènard (1996) maintains that the specificity of the investment may be considered hardly influential.

The analyses of contracts in the poultry sector have mainly taken into account risk sharing, incentive effects and technical changes (Koeber 1989; Knoeber and Thurman 1995; Levy and Vukina 2004; Goodhue 2000). Vukina (2001) discusses four basic reasons for contracting (risk sharing, technological change, response to changes in consumer preferences and access to capital) and states that the main components of the contract are the division of responsibility for providing inputs and the method used for grower compensation. From a complementary perspective, Mènard (1996) points out the key role of growers, the variety of agreements and the nature of the contract as a general framework.

Goodhue (2000) points out that the legal short-term contract is almost always renewed and then a long-term implicit contract exists that has to be recognized as the

expression of the true nature of the relationship. The periodic renewal of the short-term legal contract provides the integrator company with the necessary flexibility in the face of the market changes (Levi and Vukina 2004), but also allows the parties to specify contingent objectives and to face emerging issues. Thus the hybrid contractual framework substantiates both the long-term relationship and the periodically written contract. The latter could also be thought of as a phase in a very long-term relationship, with growers' preferences being at stake at both these levels.

In the light of the framework outlined above one has to point out that the grower exerts his degree of freedom -as specified in his domain of action- through rights over the use of the resources. For instance, a given disinfection or hygienic practice is carried out relying on the capacity of the grower to manage and to employ input and labor according to the contract signed with the processor. Therefore, we make the assumption that the degree of freedom can be interpreted as possibilities delimited by specific contracting rules. To our purposes, there is no difference between assuming that the contract explicitly gives the grower the freedom to do something and assuming that the contract does not explicitly forbid it.

As mentioned above, the authority, which characterizes the hybrid forms (Mènard 1994; 1996), facilitates coordination by altering the set of possible choices available to a grower (Ménard 1994). The possibility to delineate the domains of action of the growers allows the processor to coordinate the critical relationship with growers. Knoeber (2000) identifies this domain and indicates that the degree of freedom is restricted to housing, utilities, labour organization and management. At any rate, some degree of freedom still exists in carrying out certain productive tasks (i.e., the choice of disinfection method and so on). Drawing on literature and

interviews with experts, table 1 illustrate the domains of action of the grower and the processor in terms of the production process.

The degrees of freedom with respect to critical safety characteristics are mainly due to the need to allow the growers to efficiently allocate their resources and to allow for flexible responses on the farms in order to deal with specific unexpected contingencies.

The partial degrees of freedom indicate that to some extent the ways of carrying out the productive tasks are restricted by the authority of the processing company. Nevertheless the grower has some degree of freedom, but the scope of the choices is restricted by the processor.

The emerging maladaptation costs can be illustrated in a very simple way. In the case illustrated in figure 4, the maladaptation costs are due to the restriction of the choices available to G. For instance, if we imagine that the grower's ordering includes three modalities of carrying out the task τ_i and that the processor bans the one preferred by the grower, the remaining being ordered in the same pattern as P's ordering. In the absence of such a restriction the costs would be null. With the ban, maladaptation costs are predicated on the contractual terms relating to the safety technological tasks. The firm G could try to be compensated for accepting the rule and performing (τ_i); it would probably be willing to pay for adopting the rule assigning the task (τ_i)".

Table 1. Domains of action of growers and processors in poultry production processes		
Characteristics of the production process on the farm	Domain of action of the grower	Domain of action of the processing company
Number of cycles per year		x
Area of houses	x	
Number of poultry houses	x	
Separation areas	x	
Density		x
Final medium weight	(x)	x
Ventilation	(x)	x
Heating	(x)	x
Lighting system	(x)	x
Ridding methods	(x)	x
Disinfection	(x)	x
Disinfectant means	(x)	x
Feeding		x

x: *full degree of freedom;* (**x**): *partial degree of freedom*

METHODOLOGY OF THE EMPIRICAL ANALYSIS

For the purposes of the empirical investigation we assume that the *i.th* grower gains a profit π_i given the value of the final product PV_i[4], the production costs C_i and the transaction costs TC_i:

$$p_i = PV_i - (C_i + TC_i) \quad (1)$$

The transaction costs depend on the characteristics of the transaction (asset specificity, uncertainty, frequency), while the production costs can be split into two components: C_{1i} are the production costs which are not affected by the rule setting at hand; C_{2i} are the costs which could vary with the contractual rules adopted:

$$C_i = (C_{1i} + C_{2i}) \quad (2)$$

we assume:

$$(C_{2i} + TC_i) = \sum_j ß_j R_{ij} \quad (3)$$

where R represents the *j.th* rule regarding the *i.th* individual (contract), and β_j is the unit monetary value of the rule. According to our analytical framework, the equation (3) expresses the idea that the contractual rules determine the variation of production and transaction costs. The C_{1i} costs do not vary with the contracting process, thus we can directly consider the net value $PVN_i = PV_i - C_{1i}$:

$$p_i = PVN_i - \sum_j ß_j R_{ij} \quad (4)$$

The empirical investigation is aimed at providing estimates of the coefficients β_j which are interpreted in terms of production and transaction costs. For the sake of simplicity we assume that the production function exhibits constant returns in the small range of input use implied by the approach. We adopt a Choice Experiment

approach and in line with Mènard (1997) we assume that the behavioural hypothesis of bounded rationality is not really stringent in the case of poultry contracts due to several analytical reasons. In our view this gives a basis for the validity of the approach chosen, but the distribution of information, and the respondent's possibilities of managing it, need to be taken into consideration (DeShazo and Fermo 2002; 2004).

In the light of the analysis of Bougherara and Ducos (2006), we posit that the utility due to a prodution contract is a linear function of the contractual rules:

$$U_{cpi} = ß_i + \sum_j ß_j R_{ij} + e_{cpi} \quad (5)$$

where U_{cpi} is the utility for the individual *i.th* who chooses the contract *c.th* of the set *p.th.* We assume that a grower prefers the production contract *h* (utility level U_{hpi}) instead of the current contract *c* (utility level U_{0pi}) if:

$$U_{cpi} - U_{0pi} = ß_i + \sum_j ß_j \left(R_{cij} - R_{0ij}\right) + \left(e_{cpi} - e_{0pi}\right) > 0 \quad (6)$$

Given equation (3), it is easy to show that the differences in the contractual rules in (6) correspond to differences in both production costs and C_{2i} transaction costs:

$$\sum_j ß_j \left(R_{ihj} - R_{cij}\right) = \left(C_{2i0} - C_{2ic}\right) + \left(TC_{i0} - TC_{ic}\right) = \left(\Delta C_{2i} + \Delta TC_i\right) \quad (7)$$

Each contractual rule determines variation in the costs mentioned:

$$\sum_j ß_j \left(R_{ihj} - R_{cij}\right) = \sum_j \left(\Delta C_{2i}\right)_j + \sum_j \left(\Delta TC_i\right)_j \quad (8)$$

The utility of a grower is thought of as a function of different factors which can be ruled by contract, Hudson and Lusk (2004) and Roe, Sporleder and Belleville

(2004). It is then assumed that the growers' utility (U) can be expressed in terms of certain contractual attributes:

$$U = U(I, L, A, T, V) \tag{9}$$

where:

- I is the variance of the grower's income;
- L is the length of the contract;
- A is the degree of the grower's entrepreneurial autonomy;
- T means the specific food safety technology;
- V indicates the risk.

Further we assume that:

$$\partial U / \partial I > 0 \tag{9a}$$

$$\partial U / \partial L < 0 \tag{9b}$$

$$\partial U / \partial A < 0 \tag{9c}$$

$$\partial U / \partial V < 0 \tag{9d}$$

and defined $C(T)$ the cost of technology,

$$\partial U / \partial C(T) < 0 \tag{9e}$$

the utility increases depending on expected decrease in the cost of technology.

By combining the equations (1), (8) and (9) we can write:

$$\Delta U_i = b_i + \sum_j b_j (R_{ihj} - R_{cij}) + (e_{cpi} + e_{opi}) \tag{10}$$

Contractual Attributes

Equation (7) suggests that the coefficient estimated can be interpreted in terms of both production and transaction costs. The empirical approach is based upon a choice

experiment (Louviere et al. 2000) concerning the contractual attributes. Our goal here was to provide empirical evidence regarding the relations between organization and technology in the context of the analytical framework proposed. The experiment involved 169 poultry growers in central Italy studied over the period June-September 2005. A preliminary study was carried out analyzing the contractual relationship at that time with the management of the company chosen. In that phase the focus was on the general contractual attributes, the geographic distribution of farms, and the history of the company. The goal of the phase was to define the relevant contractual attributes to be taken into consideration in the experiment. As a second step, possible contracts were submitted to growers in order to elicit their preferences about contract attributes. The contract attributes chosen, drawing from the literature used to design the experiment (Hudson and Lusk 2004), are illustrated in Tab. 2. *Contract Length* refers to the periodic written contract and was considered in order to examine the duration of the link between the grower and the processor company, which affects the hybrid stability. The individual grower is expected to have an interest in a sufficiently long-term relationship. On the other hand, too great a length tends not to be preferred as it may reduce the grower's opportunities for improving the arrangements. *Production Cycles/year* was introduced as a proxy of the annual income (the average annual net income is estimated as 15,000 euro/year/farm) in order to avoid bias in responding to questions directly concerning the amount of income. Then the number of both chosen and not chosen alternatives was multiplied by a scalar corresponding to the average income/cycle.

Degree of autonomy - Growers are involved in managing agricultural firms which may not be specialized in poultry production, hence they may be interested in

shaping the organization and technology in order to meet individual goals. On the other hand, the interest in a long-term relationship could attenuate the importance of autonomy. Hybrids are a mix of competition and cooperation (Mènard 2004) and the occurrence of food safety shocks stresses the need for cooperation. Growers' preferences could reflect this mixed nature.

Table 2. Choice set of contract attributes

Attributes	Level 1	Level 2	Level 3	Implied variation of production costs
Contract Length (years)	1	3	5	NO
Production Cycle/Year	1	3	4-5	YES
Degree of Autonomy	Autonomous	In collaboration with the purchaser	Only with direction of purchaser	NO
Disinfection Practices	Chemical products	Heat	Fumigation	YES
Variable Fraction of Price	0%	20%	80%	NO

Disinfection practices were chosen in order to take directly into account the role of food safety strategy in contractual arrangements, as it represents a critical element in dealing with food safety enhancement. These practices are partially in the domain of action of the grower which means that usually the processor's directions allow the grower to choose the practices preferred among a small number of possibilities. *Variable fraction of price* was introduced to take into consideration the role of the risk (Hudson and Lusk 2004; Allen and Lueck 1995). The focus is on price risk assuming it can express a prominent part of the risk faced by growers. Price is linked to productive yield in a complex 'price formula' included within the contract. The variability of price is (non-linearly) correlated to the (technological) efforts of the growers and depends upon on the not easily controlled technological variability. A higher contract price may be contrived whereas the variable fraction was high. The interaction effects between income and other variables have been considered.

Two types of information are drawn from the model estimated. Firstly we analyze WTP and WTA for contractual rules, and then we consider the related maladaptation costs. In the conditional logit model the error term is often assumed to be homoscedastic but many researchers have focused much this assumption (Hensher et al. 1998; DeShazo and Fermo 2002; 2004; Scarpa et al. 2004; Hole 2006).

In our applied work we test the homoscedasticity assumption because we want to analyze factors that influence the variance of the latent variables in the model. Following Hole (2006) we use several tests for heteroscedasticity in the conditional logit model.

Variables Coding

The attribute variable *Production Cycles* was transformed into a new variable, *Income*, by multiplying each value by the scalar 15,000 euro/year/farm. Both *Income* and *Length* were included in the model as continuous variables. The remaining attribute variables were coded as effect codes. Thus the model includes: *Coll* (Degree of Autonomy: in collaboration) and *Aut* (Degree of Autonomy: autonomous); *Chemp* (Disinfection practices: Chemical Products) and *Heat* (Disinfection practices: Heat); *Risk20* (variable fraction of price: 20%) and *Risk0%* (variable fraction of price: 0%). The design of the experiment is thus based on five attributes with three levels. This generates a full-factorial design including 3^5=243 possible contracts. Since this number cannot be handled in the experiment, a fractional-factorial design was determined (Kuhfeld et al. 1994) including 54 possible contracts. These contracts were randomly distributed obtaining 18 choice sets, each including three choice alternatives. Each grower was then requested to choose one of the three contracts proposed.

EMPIRICAL FINDINGS

Econometric Results

The main characteristics of the units observed are presented in Table 3. Table 4 illustrates the model estimates and the basic econometric results.[6]

At first the Income coefficient estimated appears positive and significant (at 1%), supporting the hypothesis that expectations regarding income really do contribute to shaping the growers' preferences in contracting. The *Length* coefficients also indicate that growers rely on the possibility of periodically improving the contractual arrangement. The variables relating to the degree of autonomy are partially significant, indeed only (*Coll*) parameter is significantly different from zero (10%). From a theoretical point of view, one could argue that the idea of preferences depending on institutional environment, governance forms and individuals, introduced by Williamson (1996), could explain this evidence. *Chemp* shows a significant coefficient, indicating that it is of interest for growers and that in particular they would prefer to negotiate some technical prescriptions related to food safety. Results concerning the attribute '*Variable fraction of price*' show that the risk coefficients are significant at 10% , suggesting a role for price risk. Even though the IIA assumption is not violated, from an economic point of view the hypothesis of heterogeneity of preferences could be directly taken into account (Hudson and Lusk 2004).

Table 3. General characteristics of the Farmers and Farms		
Characteristics	No. of respondents	Relative frequency (%)
A) FARMERS		
Education	121	100.0
Primary School	52	43.0
Secondary School	59	48.7
University degree	10	8.3
Frequency of technical training	121	100.0
Never	23	19.0
Rarely	56	46.0
Systematic	42	35.0
B) FARMS		
Poultry Houses (m^2)	90	100.0
1.000-1.499	13	14.5
1.500-1.999	8	8.5
2.000-2.499	11	12
2.500-2.999	11	12
3.000-3.499	11	12
3.500-3.999	5	5
4.000-4.499	12	13.5
4.500-4.999	2	2.5
5.000-5.999	7	7.5
6.000-6.999	4	4.5
7.000-7.999	2	2.5
>8.000	4	4.5
Poultry Gross Product /Year	90	100.0
< 250.000	63	70
250.000-500.000	25	27.7
> 500.000	2	2.3

Source: Poultryflorgut WP5 - Database A

Table 4. Conditional logistic regression (Main effects)		
Variables	Coefficients estimated	Std. Err.
Length5	-1.2468 (a)	0.3441
Length3	-2.0626 (c)	1.1383
Income	0.0003 (a)	0.0001
Coll	1.6021 (c)	0.8918
Aut	0.2685	0.5681
Chemp	3.0605 (b)	1.4580
Heat	0.2632	0.6194
Risk100	1.5119 (c)	0.9086
Risk80	-2.3020 (c)	1.2974

Dependent variables = Choice; Log likelihood = -29.903; Number of obs. 363, LR c2(9) = 206.06; Pseudo R^2 = 0.7750; (a) significant at 1%, (b) significant at 5%, (c) significant at 10%

A Random Parameter Logit model approach (McFadden and Train 2000) was estimated.

First of all, the hypothesis that parameters are randomly distributed was tested following the procedure illustrated by Hensher, Rose and Greene (2005).

However, the parameters estimated are not statistically significant. Table 7 illustrates the estimated WTP or WTA derived from the estimated model. The parameters are calculated from 1089 draws from the sample. For each draw, relevant parameters, deviation standard and confidence intervals were estimated.

The growers would prefer to be compensated as the contractual *Length* increases; that is, the amount of compensation increases as the contractual duration increases. Since growers have to keep the value of investments which can be allocated only to the poultry sector, the evidence may reflect the growers' search for better arrangements and the existence of a competition process among hybrids. The amount of growers' WTP for enhancements of the degree of collaboration with the company (see *Coll* variable's WTP) is high (about 61% of the average income of a production cycle), indicating the great utility the growers expect to achieve.

Table 5. WTP and WTA computation

Variables	Coefficients estimated	Std. Err.	Conf. Interv. 95%	
Length5	-8630.84 (a)	1842.57	-12242.20	-5019.48
Length3	-5855.87 (a)	1865.75	-9512.68	-2199.07
Coll	5280.86 (a)	1700.34	1948.26	8613.45
Aut	-1083.34	1717.86	-4450.27	2283.60
Chemp	9217.45 (a)	1890.66	5511.82	12923.07
Heat	-2146.04	1720.62	-5518.40	1226.32
Risk 0%	2944.78 (b)	1484.82	34.59	5854.98
Risk 20%	-3361.84 (b)	1624.51	-6545.81	-177.86

Dependent var. = Choice; No. of obs. 363; Bootstrap Rep. 1089; (a) significant at 1%, (b) significant at 5%, (c) significant at 10%

Analogously, the WTP for introducing *chemical disinfection practices* indicates that changes in this field really are requested; this could also suggest a specific concern for the food safety strategy of the company. The growers would pay to minimize the level of price risk to which they are usually subject. This result is compatible with evidence from the literature and confirms that growers tend to hold a stable, quasi-integrated relationship with the processing company. This may also reflect the growers' awareness of the impossibility of modifying the contractual 'price formula', in other words.

DISCUSSION

The empirical findings indicate that maladaptation costs play a role in the poultry contract. Estimates of maladaptation costs are obtained in the case of Length5 and of Length3: the grower requires to be compensated for increasing the duration of the contract. A little compensation would also be required in the case of a greater degree of autonomy and, according to literature, of risk.

The growers prefer to collaborate. On the one hand, the economic rationale for this is the opportunity, provided by the long-term relationship, for growers to allocate their resources; on the other hand, it is the domain of action which provides a satisfying structure for cooperation. The growers recognize this role and the possibility of the utilization of the resources which are, at least partially, specific to the transaction. The preference for short-term written contracts suggests that the chance of periodic re-negotiation is complementary to the collaboration. This also implies that the possibility of changes in written contractual terms is taken for granted within the long-term contractual framework. The finding concerning technology also suggests the possibility of negotiating changes. According to the evidence previously

obtained, these changes are admitted within the context of a collaborating relationship.

CONCLUSIONS

The study assumes that hybrid organizational forms may be efficiently chosen by the agents in order to enhance the degree of food safety. Expanding on previous literature, the general relationship between technology and food safety strategies along the supply chain is taken into consideration, and the question of how hybrid structures may channel technical changes is addressed. The focus is on testing the hypothesis that these changes may occur in the context of complex relationships. The analytical framework also assumes that the contractual framework is in turn characterized by the domain of action, the procedure to dictate action *ex post* and means to ensure *ex post* the performance of reciprocal commitments. In this context, the preferences of growers in the poultry sector are examined, and the influence of hybrids in channeling technological changes by supporting long-term relationships is tested. The adoption of technological changes oriented to food safety is promoted by monetary incentives embedded within the more complex governance mechanism, and in the context of the long-term relationship. Monetary incentives directed towards promoting the adoption of food safety oriented technological changes are embedded within the more complex governance mechanism, emphasizing the relevance of the long-term relationship.

Proposals for the future development of this study are, firstly, that it could be enhanced by collecting more empirical evidence and testing the hypothesis of heterogeneity of preferences. Furthermore, the role of preference on the contracting

process within hybrid forms could be investigated by examining it within a different contractual framework, drawing more robust relationships from empirical data.

NOTES

[1] The firm P is supposed to have the coordinating power: this assumption reflects the usual condition in Agri-Food chains, where the agricultural firms are unable to influence the downward stages without any strategy of association.

[2] Under a logical perspective a party is likely to firstly consider the most efficient way of carrying out the tasks at stake, thus there is no link between the two categories of costs.

[3] For instance, the final market of the poultry product has an oligopolistic structure where the companies tend to maintain their own market share. The market for 'raw material' reflects this structure, the scale of the processing companies and their technology. As a consequence each company level tends to deal with a set of growers whose supply under contract covers the specific demand share. This stable relation reflects in turn the stability of the long-term relation between the grower and the processor.

[4] The value of the product of the grower depends in turn on the performance achieved in managing the production process, according to the rules chosen by contract. As our analysis concerns the setting of production rules, it seems reasonable to assume that the grower will do his best to follow the rule chosen. Therefore PV is thought of as given in our approach.

[5] We can obtain the maximum likelihood (LL) estimate of $\omega=(\beta^*, \gamma^*)$ adopting the follow function: $LL = \sum_{k=1}^{K} \sum_{n=1}^{N} y_{kn} \ln P_{kn}$ where y_{kn} =1 if alternative n is chosen by individual k and zero otherwise.

[6] The three contractual alternatives are 'equivalent' in terms of exit option: a Hausman test was then performed by simply excluding the first alternative in each choice set. The test (χ^2=2.74(0.84)) indicates that the IIA hypothesis is not rejected.

REFERENCES

Allen, D.W. and D. Lueck. 1995. Risk Preferences and the Economics of Contracts. American Economic Review 85 (2): 447-451.

Bougherara D. and G. Ducos. 2006. Farmers' Preferences over Conservation Contract Flexibility and Duration: An Estimation of the Effect of Transaction Costs Using Choice Experiment, (Esnie-INRA Economie et Sociologie Rurales, Rennes) http://esnie.u-paris10.fr/fr/journees-dates/Bougherara_Ducos.pdf (downloaded on 25august 2008)

Brosseau, E. and J.M. Glachant. 2002. The Economics of Contract and the Renewal of Economics. In The Economics of Contracts. Theory and Applications, edited by E. Brosseau and J.M. Glachant, 3-30. Cambridge: Cambridge University Press.

Brousseau, E. and E. Raynaud. 2006. The Economics of Private Institutions: An Introduction to the Dynamics of Institutional Frameworks and to the Analysis of Multilevel Multi-Type Governance. SSRN, http://ssrn.com/abstract=920225 (accessed January 4, 2008)

DeShazo, J.R. and G. Fermo 2002. Designing choice sets for stated preference methods: the effects of complexity on choice consistency. Journal of Environmental Economics and Management 44 (1): 123-143.

DeShazo, J.R. and G. Fermo 2004. Implications of Rationally-Adaptive Pre-choice Behavior for the Design and Estimation of Choice Models. http://faculty.spa.ucla.edu/deshazo/pdf/16/Microsoft%20Word%20-%20deshazo_fermo_081004.pdf (accessed December 14, 2007)

Fulponi L., 2006. Private voluntary standards in the food system. The perspective of major food retailers in OECD countries, Food Policy. 31 (1), 1-13

Furubotn E. and Richter R., 1997. Institutions and economic theory: The contribution of the new institutional economics. Ann Arbor: University of Michigan Press

Goodhue, R.E. 2000. Broiler Production Contracts as Multi-Agent Problem: Common Risk, Incentives and Heterogeneity. American Journal of Agricultural Economics 82 (3): 606-622.

Hensher, D., J. Louviere and J. Swait 1998. Combining sources of preference data. Journal of Econometrics 89 (1-2): 197-221.

Hensher, Rose and Greene (2005). Applied Choice Analysis. Cambridge: Cambridge University Press

Hobbs, J.E. 2004. Information asymmetry and the Role of Traceability Systems. Agribusiness 20 (4): 397-415.

Hole, A. R. 2006. Small-sample properties of tests for heteroscedasticity in the conditional logit model. Economics Bulletin 3 (18): 1-14

Hudson, D. and J. Lusk. 2004. Risk and Transaction Cost in Contracting. Results from a Choice-Base Experiment. Journal of Agricultural and Food Industrial Organization 2 (2): 1-17.

Knoeber, C.R. 1989. A Real Game of Chickens: Contracts, Tournaments, and the Production of Broilers. Journal of Law, Economics and Organization 5 (Fall): 271-292.

Knoeber, C.R. and W.N. Thurman. 1995. Don't Count Your Chickens…: Risk and Risk Shifting in the Broiler Industry. American Journal of Agricultural Economics 77 (3): 486-496.

Knoeber, C.R. 2000. Land and Livestock Contracting in Agriculture: A Principal-Agent Perspective. In Law and Economics Encyclopedia 5920: 1133-1153. http://encyclo.findlaw.com/5920book.pdf (accessed January 24, 2008)

Kuhfeld, W., R. Tobias and M. Garrat. 1994. Efficient Experimental Design with Marketing Research Applications. Journal of Marketing Research 31 (4): 545-557.

Levy, A. and T. Vukina. 2004. The League Composition Effect in Tournaments with Heterogeneous Players: An Empirical Analysis of Broiler Contracts. Journal of Labour Economics 22 (2): 353-377.

Louvière, J.J., D.A. Hensher and J.D. Swait. 2000. Stated Choice Methods. Cambridge: Cambridge University Press.

Martinez, S.W. 1999. Vertical Coordination in the Pork and Broiler Industries: Implications for Pork and Chicken Products. USDA, Report, n.777. Food and Rural Economics Division. Economic Research Services.

Martino, G. and C. Perugini. 2006. Hybrid Forms in Food Safety Supply. In International Agri-food Chains and Networks: Management and Organizations, edited by J. Bijman, O. Omta, J. Trienekes, J. Wijnands and E. Wubben, 199-215. Wageningen: Wageningen Academic Publisher.

Mazè A. 2002. Retailers' branding strategies. Contract design, organisational change and learning, Journal on Chain and Network, 2 (1), 33-44

McFadden, D. and K. Train. 2000. Mixed MNL Models for Discrete Responses. Journal of Applied Econometrics 15 (5): 447-470.

Ménard, C. 1994. Organization as Coordinating devices. Metroeconomica 45 (3): 224-247.

Mènard, C. 1996. On Clusters, Hybrids and Other Strange Forms: The Case of the French Poultry Industry. Journal of Institutional and Theoretical Economics 152 (1): 154-183.

Ménard, C. 1997. Le pilotage des formes organisationnelles hybrides. Revue Economique 48 (3): 741-750.

Mènard C., 2002. Enforcement procedures and Governance structures: What relationship? In Mènard C., (ed.), Institutions, contracts and organizaion. Perspectives from New Institutional Economics, Cheltenham: Edward Elgar Pub. 234-253

Ménard, C. 2004. The Economics of Hybrid Forms. Journal of Institutional and Theoretical Economics 160 (3): 345-376.

Mènard, C. and E. Valceschini.2005. New institutions for governing the agri-food industry. European Review of Agricultural Economics 32 (3): 421-440.

Muthoo, A. 1999. Bargaining Theory with Applications. Cambridge: Cambridge University Press.

Réviron, S. and JM. Chappuis, 2005. Effects of the Swiss Retailers' Strategy on the Governance Structure of the Fresh Food Products Supply Chains. Agribusiness 21 (2), 237-252.

Roe, B., T.L. Sporleder, and B. Belleville 2004. Hog Producer Preferences for Marketing Contract Attributes. American Journal of Agricultural Economics 86 (1): 115-123.

Scarpa, R., K. G. Willis, M. Acutt and S. Ferrini S 2004. Monte Carlo simulation evidence on the effect of the status-quo in choice experiment models for water supply. (paper presented at European Association of Environmental and Resource Economists, Budapest June 2004).

Simon, H. A. 1991. Organization and Markets. Journal of Economic Perspective 5 (2).25-44.

Valceschini E., E. Raynaud and L.Sauveè. 2005. Alignment between Quality Enforcement Devices and Governance Structures in the Agro-food Vertical Chains. Journal of management and Governance. 9 (1). 47-77

Vukina, T. 2001. Vertical Integration and Contracting in the U.S. Poultry Sector. Journal of Food Distribution Research 32 (2): 29-38.

Williamson, O.E., 1991. Comparative Economic Organization: the Analysis of Discrete Structural Alternatives. Administrative Science Quarterly. 36 (2), 259-296.

Williamson O.E., 1996. The Mechanism of Governance. New York Oxford, Oxford University Press.

Yvrande-Billon, A. and S. Saussier 2004. Do Organization Choices Matter? Assessing the Importance of Governance Through Performance Comparisons. WP-2004-4. http://www.grim.net\documents\Stephane-Saussier\wp-steèham-billon.pdf (accessed February 11, 2008).