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CONTRACTS AND INCENTIVES IN QUALITY BEEF CHAIN: ANALYSING ORGANIZATIONAL FAILURES

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1. Introduction

Coordination mechanisms are determinant factors for agrisystems competitiveness. Coordination implies, among other things, conciliating divergent interests in favor of common goals. Transaction Costs Economics (TCE) and Incentives Theory (IT) delimit the problem, respectively, under the lenses of assets specificity and incentives structures, motivated by the search for efficiency. Among different forms of coordination forms, contracts emerge as a governance form.

In agrisystem coordination literature contracts assume an important role (MENARD, 2002; MENARD, KLEIN, 2004; MARTINEZ; ZERING, 2004; ZYLBERSZTAJN, 2005; ZYLBERSZTAJN, FARINA, 1999). Different contract structures are observed in each production activities. In the United States, 47% of the animal production occurs under contract form, and the production of bovine meat is the one that presents the lesser indices¹ (MAC DONALD, KORB, 2006). In Brazil², Zylbersztajn (2005) points out that contracts cover a growing share of agricultural activities. However, considering the animal production, such as in USA, beef production is less aligned with contractual governance mode. Why is that so? What are the reasons for low contracting adoption in the beef productive system? Specifically, this paper aims to identify the reasons for low adoption of formal contracts

¹ The contracts of poultry and egg production represent 88.2% of the value produced in the United States, while pork and beef represent, respectively, 57.3% and 28.9%. Considering Brazil, large part of poultry and pork production are coordinated by the processing industry under contracts.

² Examples of the relevant role of contracts in the Brazilian agribusiness are found in the market of land rent and food production. Anticipated purchase of soy for the crush industry (FLORENCIO, 2008), the citrus contracting production (CHADAD, 2007) and sugar and alcohol production (PEDROSO, 2008), beyond the commercial transactions in the sector of animal protein production, especially those in the poultry and hog (ZYLBERSZTAJN, 2005) signal for the importance of the hybrid forms of governance for the coordination of Brazilian agrisystems.

examining contractual arrangements in beef Quality Programs developed by Brazilian meat industries.

The Brazilian beef chain is characterized by its complexity and diversity. The demand for quality products with traceability cares for healthy, social and environment concerns. For that an efficient coordination between industry and production should be taken. This new context imposes challenges to the sector. The processing industries, mainly those oriented to the international market, develop **Quality Programs** that, in last instance, represent a private initiative for carcasses classification and standardization. These programs aim to incentive the production of standardized animals in order to attend industrial processes optimization and consumer demand for quality. Compensations are given to cattle growers as a form of incentives in order to have animal carcasses with attributes related to beef quality.

The difficulty in creating mechanisms of incentives to induce cooperation stands out the quandary faced by the Brazilian beef chain. What should seem obvious - to adopt coordinated systems that add value to the product and represent profits for the whole sector - presents difficulty in handling relations under the scope of production and industry. Both agents discredit the effectiveness of those called **Quality Programs**, although they affirm that the cooperation is the way to achieve competitiveness. This paradox points to the relevance of the subject, which is to analyze coordination imperfections. Traditionally, the literature focuses the efficiency model with little attention for the understanding of organizational failures.

Regarding the literature gap, this research has the objective to study the pattern of contracts in Brazilian **Quality Beef Programs** considering the imperfections in their institutional arrangements mechanisms. The main research questions are: i) Is the incentive structure to promote cooperation enough? ii) Which are the risks involved? iii) What is the role of legal institutions?

2. Theoretical framework

The subject of vertical coordination will be treated considering two theoretical frameworks: i) The Principal-Agent theory and ii) The Transaction Costs Economics (TCE). The incentive idea is present in both approaches. In the first one, the incentive is structured by means of **ex ante** contracts where risk and prizes are placed in order to provide the necessary incentives for the transaction. For TCE the contracts are incomplete and also involve **ex post** negotiation, since the agents are not fully rational. The investment in specific assets creates the possibility of quasi rents capture, once the agents have an opportunistic behavior. For that approach, the governance modes provide the necessary incentives for the economic transaction.

2.1 Principal-agent theory

The problem of principal-agent arises when one party (the principal) delegates to another (agent) a task. In condition of informational asymmetry, since the principal does not have access to all information gathered by the agent, it is difficult to assess and measure his or her performance. Risk and uncertainty are therefore inserted into the exchange, contributing to the agency cost. Based on the assumptions of rationality and self-interest, both principal and agent, seek to maximize their utility, but since goals may be different, a situation of conflict can be characterized. Contracts arise, then, as a way of creating incentives and providing mechanisms for monitoring, in order to maximize the value generated to the principal.

Based on Jensen and Meckling (1976), the agency cost is the sum of: i) monitoring costs; ii) the **bonding costs** - premiums paid to the agent as an incentive and; iii) the residual loss. The authors emphasize that agency costs apply also in cooperative relationships, provided that a relationship of principal-agent is established.

The existence of informational asymmetry, according to Besanko et al. (2006), was associated with two main elements: hidden information and hidden action. The idea of hidden information is related to the concept of adverse selection as presented by Akerlof (1970). In the presence of informational asymmetry (the seller knows better the quality of the product in comparison to the buyer), the phenomenon of adverse selection leads the buyer to consider and pay only for the average quality of the product. Uncertainty about the quality generates, then, a perverse effect: producers of higher quality goods have no incentive to market their products and, ultimately, only products of inferior quality will be traded in the market.

The assumption of hidden action, also called moral hazard, is presented by Eisenhardt (1989) as the lack of the agent's effort to apply himself to the execution of the task in accordance with the principal's interest. Due to the difficulty in observing and / or measuring the agent's action or even because of the cost of monitoring there is room for cheating. The author highlights that the share of risk is a relevant aspect to be considered in a principal-agent relationship, especially when the agents have different attitudes in face of risk. The evaluation of agent's profile, if **risk seeking**, **risk neutral** or **risk averse**, is crucial for cooperative relationships, particularly when the parties have different goals.

The identification of the level of incentives necessary to align the agent's performance with principal's interest is important for building a cooperative relationship. The problem is to identify a model that adequately addresses the variables involved in this equation: fixed wages, premium prizes, cost and risk. According to Gibbons (1998), the model applied by the Agency Theory considers that:

- a. the agent performs an action to produce an observable result y where: $y = a + e$ (where e is the error or **noisy term**);
- b. the agent is paid by a value w where $w = s + by$ (where s is the fixed wage or the intercept and b the slope of the curve or the rate of bonus)
- c. the pay-off or agent compensation is given by $w - c(a)$ or $s + by - c(a)$, where $c(a)$ is the level of effort to perform action a ;
- d. the pay-off or principal compensation is $y - w$, i.e., the net profit represented by $y - s - by$;

It is assumed that the agent is risk averse, so the higher the rate of bonus b , more incentive for better performance, but in opposite, greater the risk. If $b = 0$, there is no risk, however, the incentive is zero. Similarly, if $b = 1$, both incentive and risk are high. Thus, the efficient rate of bonus is $0 \leq b \leq 1$, depending on the agent risk profile and the proportion of error e .

The agent increases the effort until the marginal benefit is equal to marginal cost. In other words, the agent is willing to increase his or her efforts from A_0 to A_1 , only if the reward $c(a_1) - c(a_0)$ raises at the same amount. Similarly, the principal is willing to increase his or her cost (b_0 to b_1) until that is equal to the marginal benefit, i.e. the variation in y . The search for optimal solution, however, depends on the agents risk profile and how they are willing to share it, that is, the variables **probability of risk** and **risk premium** should be inserted in the model.

The classical principal-agent model looks for the optimal allocation of risk and prize (incentive) of production considering a system of efficient compensation. Holmstrom and Milgrom (1991) affirm that this model generates limited results as it does not allow to

delineate more complex organizational problems, for instance, the tasks with different dimensions, the **multitasks**. This concept is related to the different tasks that the agent had to execute to reach the desired result established by the principal. According to the authors, when it has multiple tasks to execute, the incentive not only serves to place the risk and to motivate the effort as also to direct the action of the agent for one determined dimension of the task. In other words, depending on the incentive the marginal benefit of an activity is increased at the expenses of the benefit of the other. Thus, the expected results could be perverse and it depends on how the general incentive is proposed. In synthesis, the agent when placing efforts among different tasks tends to make greater effort in that dimension which generates greater rewards. The multitask model applies to situations which involves different tasks for the same agents and also to some task with different dimensions.

Gibbons (1998) highlights another limitation of the classical model of principal-agent concerning the assumption that the result y is easily measured and that performance is only stimulated through monetary measures. Relational contracts emergence when reputational factors are present and subjective incentives measures should be considered within the model.

In summary, incentives and cooperation are related variables. However, in order to effectively promote the cooperation among agents the relation between the incentive applied and the task performed must be understood. The theory suggests that the incentive is not separated from risk analysis which in turn depends on the behavior of agents facing an event of uncertainty. The possibility of verifying the results and the multidimensional task character are also variables that must be considered in the construction of a cooperation model.

2.2 Transaction Cost Economics

The TCE analyzes the contractual world from the bounded rationality and opportunism presuppositions. The structure that minimizes the transaction costs must also consider the transactions attributes: frequency³, asset specificity⁴ and uncertainty⁵. Williamson (1985) argues that asset specificity is the key variable to identify the more efficient form of governance. An asset is considered specific to a transaction as alternative allocations imply loss of value. The possibility of contractual breaches is higher as more specific the involved assets are, since the specificity almost results in the existence of rents that can be captured in the transaction (WILLIAMSON, 1985; KLEIN et al., 1978). Williamson (1996) points out that the governance mechanism must be understood as incentive structures. Furthermore, it also represents an alternative to mitigate conflicts and guarantee mutual profits. For the TCE, **ex ante** incentives are not enough for the promotion of cooperation, contrasting to what the Principal-Agent Theory defends. Moreover, it also has to consider the necessity of **ex post** adaptations and the fact that the incentives are not essentially pecuniary. The governance structure itself is an incentive for the emergence of a cooperative environment.

The behavioral assumptions assumed by TCE are bounded rationality and opportunism. The idea of bounded rationality departs from Simon's concept (1991) that agents are intentionally rational but they are so in a limited way. Since the agents are limited

³ Williamson (1985) classifies frequency as recurrent and occasional and he identifies the efficient mode of governance relating it to asset specificity. The frequency is related to transaction regularity and, if recurrent it involves the construction of reputation.

⁴ According to Williamson (1996), asset specificity should be classified in: i) local specificity; ii) physical specificity; iii) human specificity; iv) time specificity; v) dedicated assets and vi) brand.

⁵ The uncertainty is linked both to information availability and to the probability of occurrence of a given event. In presence of uncertainty it is required specific governance form in order to adapt to environment turbulence (WILLIAMSON, 1985).

in their cognitive abilities, contracts are necessarily incomplete (AZEVEDO, 1996; HART, 1991; WILLIAMSON, 1991). The opportunistic behavior implies the possibility of an **ex post** contract breaching, opening room for moral hazard and hold-up events. Hence, there is the necessity of creating contracts safeguards **ex ante**.

According to Williamson (1996), the existence of incomplete contracts accounts for a significant part of economic problems. Based on the assumptions of bounded rationality and opportunistic behavior, the presence of contractual safeguards becomes an important factor in understanding how to proceed with the trade in a long-term perspective. Zylbersztajn and Zuurbier (1999) argue that the challenge is to design complete and comprehensive contracts to cover the contingencies which arise from opportunistic behavior and business environment uncertainties. Moreover, the possibility of cooperative action as a solution for contracts failures would be only possible if not considering opportunism as a premise, which for the authors is a naïve perception.

In addition to behavioral assumptions, the identification of governance structures which minimize transaction costs should also consider the transaction attributes such as frequency, asset specificity and uncertainty. The alignment model proposed by Williamson (1985, 1996) creates a continuum whose extremes are market relation and vertical integration and the shifting parameter is the asset specificity. From this perspective, hybrid forms of governance, located at an intermediate position between the extremes mentioned above, emerge as efforts of coordination to align towards the minimization of transaction costs. Among different hybrid forms of governance there are contracts. The contracts, explicit or implicit, are understood as forms of governance that provide incentives for the transactions. Given their incompleteness, it is necessary to offer safeguards in order to prevent from environment uncertainty and to avoid hold-up events caused by opportunistic behavior.

Williamson (1996) suggests that the governance modes must be understood as structures of incentives and that they represent an alternative to mitigate conflicts and ensure mutual gains. From that assumption, **ex ante** incentives are not sufficient to promote cooperation in contrast to what advocates the theory of principal-agent. Considering TCE, it should also be considered the need for **ex post** adjustments. Moreover, incentives are not necessarily monetary; the governance structure itself may represent an incentive mechanism for the emergence of a cooperative environment.

For TCE, the operation of the legal system and the contract's guarantee involve positive transaction costs (Williamson, 2000). Since the courts are not the only alternative for resolving disputes, firms and institutional arrangements emerge as solutions to conflicts. The institutional environment is exogenous to the model. However, changes in laws and regulations can promote equilibrium solutions displacement.

3. General hypotheses

- There is a high percentage of failure in coordinated beef quality subsystems since consumers are not willing to pay the compensations (premium price) high enough to remunerate the investments made by all the economic agents involved in supplying quality (producers, processing meat industry and retailers);
- The animal quality is evaluated from a complex system of carcass classification (multi-dimensional aspect of quality), which linked to bonuses paid by the industry, does not generate incentives strong enough to induce the production of quality;
- Given the great variability of the market price, the low awards received by producers are not considered as an incentive.

4. Methodological approach

The methodology involves the development of a theoretical model which is afterwards applied to a multi-case study. Two Brazilian's beef Quality Programs coordinated by the processing industry are analyzed. The qualitative approach is developed with two beef exporters companies with relevant share in the Brazilian beef exportations⁶. The survey was conducted through semi-structured interviews with managers of their Quality Programs. Considering the investments in specific assets taken by cattle raisers and the industry, the proposed theoretical model attempts to delineate the necessary incentive structure for producing quality beef. For that, it is considered the multidimensional character of quality, since that different attributes of the animal are exchanged. Some model assumptions:

- The quality beef subsystem is conceptualized as an expanded firm where employees are represented by three categories: production, slaughterhouses and retail;
- The meatpacking industry is responsible for the slaughter; the carcasses processing and deboning are performed by retail;
- Quality beef is produced through consecutive stages. The final quality (Y) depends on the quality of intermediate products, i.e., the quality of animal raised at farm level (X₁), the quality of carcasses delivered by the slaughterhouse (X₂) and the quality of beef cuts sold at retail (X₃). Formally, a quality beef production depends on the efforts applied by all agents in previous steps within the chain: $Y = Y(X_1, X_2, X_3)$, where:

Y = quality beef at consumption level

X₁ = animal quality (producer)

X₂ = carcass quality (industry)

X₃ = beef cuts quality (retail)

- The firm production (the coordinated subsystem) is conceived as a weak line structure (BRANDTS; COOPER, 2006). So, the worst performing agent determines the maximum possible result (the weakest link determines the final result);
- The bonuses system is defined as an incentive mechanism as a way to encourage agents (employees of the firm) to strive their best to produce a quality product. The bonus represents a positive percentage above the market price;
- There is not a technological constraint for the production of quality beef;
- Model restrictions: i) The level of effort that the agents are willing to make in previous stages of production and; ii) the price premium that final consumers are willing to pay for quality;

5. Theoretical model

⁶ A quantitative approach will be the next step of this research. The success of a coordinated subsystem regarding the incentive transmission through a productive chain will be analyzed applying a Monte Carlo simulation.

The central assumption is the efficient allocation of scarce resources between alternative and competitive ends. The developed model estimates the interaction of two individuals, the supplier (cattle raiser) and the purchaser (processor industry). The economic analysis is developed from the model of rational choice where some presuppositions are considered: i) the individual is autonomous, rational and self-interested; ii) the individual maximizes his or her utilities; iii) the information is asymmetric which results in the possibility of moral hazard and adverse selection.

The model illustrates the exchange between the producers and the beef industry focusing on quality products. Quality is understood as a set of attributes defined by the processing industry. The challenge is to build an incentive structure in order to induce the supplier to care about the specifications established by the industry. Cattle raisers agree to undertake specific investments in quality production since that premium prices are paid in order to remunerate the costs and the risk involved in the activity. The industry also carries out specific investments which imply costs. In the presence of specific assets, quasi rents are created opening room for value capture. Institutional arrangements failure is evidenced. The delivery of quality to the final consumer depends on the quality of the processed raw material (animal). The industry financial return depends on the optimization of its processes which implies less variability in the pattern of the animal supplied. Agent (supplier/ cattle raiser) and Principal (meat processor) search to maximize their utilities. The incentive for quality supply is a prize for the attributes demanded by the industry which is a percentage above the market price. In sum, three models are developed: i) production; ii) beef industry and iii) interaction between production and industry (equilibrium status).

The model requires the interaction of two agents, an agricultural producer (**P**) and an industry (**I**). The transacted product (the animal) has a level of quality where (**M**) represents a set of attributes defined by the industry.

Producers are willing to make specific investments (e_p) in quality production since the incentives generated by the industry pay the costs (c_{ep}) and the risk (w) which arises from the production of quality attributes. In the case of specific investments, quasi-rents are created, opening room for capture. The industry also makes specific investments (i) for the processing of superior quality products which involves costs (c_{ei}).

The delivery of a superior quality product to final consumer depends on the quality of the processed raw material. The industry's profitability also depends on the optimization of its production processes which require a low level of product variability in terms of the animal delivered by the supplier.

Both agent (supplier of raw material/animal) and principal (industry), seek to maximize their utilities. The incentive for the production of quality animals means paying a bonus (b) for the attributes that attend the specifications defined by the industry. The bonus is paid as a percentage over the market price (p).

a) Production

Considering the raw material supplier with qualities attributes (**M**), its utility is given by:

$$(1)UP = p + b_{ep}(p) - c_{ep}$$

The quality required by the industry will be achieved if the producer marginal benefit is at least equal to their marginal cost. In other words:

$$(2)b_{ep} = c_{ep}$$

As the producer is risk averse, the risk prize (w) of producing a high quality animal, which investment could be captured as a quasi-rent, should also be considered. Thus:

$$(3)UP = p + b_{ep}(p) - c_{ep} - w$$

$$(4)b_{ep} = c_{ep} + w$$

However, the quality has various dimensions. A quality product is measured from a set of attributes and each attribute means, in turn, that specific investments are made by the supplier. The multidimensional character of quality gives more complexity to the structure of incentives, as follows:

$$(5)UP = p + [b_{ep,1}(p) + b_{ep,2}(p) + b_{ep,3}(p) + \dots + b_{ep,n}(p)] - c_{ep} - w$$

$$(6)b_{ep,1} + b_{ep,2} + b_{ep,3} + \dots + b_{ep,n} = c_{ep} + w$$

Where $b_{ep,i}$ para $i \in \{1, \dots, n\}$ represents the prize paid for the dimension i .

b) Processing Industry

Considering the processing industry (\mathbf{I}) and the processed product price as p_c , its utility function is defined below:

$$(7)UI = p_c + b_{ei}(p_c) - c_{ei} - p$$

The industrial optimization processes require low variability in the supplied product (animal). Assuming that some variability does exist, its cost of production can be broken down into some related costs: i) the specific investment (c_{ei}); ii) the acquisition of raw material (p) and; iii) the prize for the risk of failure in the supply of homogenous quality (c_v).

$$(8)UI = p_c + b_{ei}(p_c) - c_{ei} - p - c_v$$

Assuming that the processor is risk neutral to the generated quasi-rents created along the industrial processing⁷, the utility maximization occurs when the marginal benefit is equal to the cost of production and transaction.

$$(9)b_{ei} = c_{ei} + p + c_v$$

c) Production and industry equilibrium

The balance between production and industry in multidimensional incentive contracts is achieved when the marginal benefits of the agent are at least equal to the marginal benefits of the principal, as presented below.

$$(10)[b_{ep,1} + b_{ep,2} + b_{ep,3} + \dots + b_{ep,n}] = b_{ei}$$

⁷ The final consumer' utility when applied to the model generates the possibility of quasi rent capture along the industrial process. This variable should then be considered when a more robust analysis be built.

From the restriction posed above, incentives contracts between production and industry must be designed in a way that allows the balance between the different incentives for each dimension of quality. In addition, returns associated with specific investments and the risk must be considered. Regarding the risk, for suppliers it is exemplified by the risk of quasi rent capture generated in the production of a quality animal and for the industry it is the variability in the processed product. Thus:

$$(11)c_{ep} + w = c_{ei} + p + c_v$$

In general, the benefit that the industry will receive when selling a high quality beef to consumers should at least pay the benefits the industry paid to suppliers. Similarly, the contract must ensure that the risk of product variability represents part of the cost of the supplier.

6. Quality Programs in the Brazilian beef chain: an empirical qualitative analysis

The Brazilian beef chain is characterized by its diversity. Batalha et al. (1999) conducted a study in which the beef chain is classified in at least two subsystems: i) subsystem A and ii) subsystem B. The former presents high technological levels and quality standards, while in the last the meat processing industry shows less technology, quality and management efforts. The subsystem B is basically represented by the performance of municipal slaughterhouses, illegal slaughterhouses and craft and semi-craft processing units. Considering the coordination aspects, the subsystem A presents a set of institutional arrangements such as marketing alliances (with industry and/or retail), quality programs coordinated by the processing industry, coordinated exporting subsystems (for instance, traced animals for the Union European consumption) and the price coordination held by the spot market. Such institutional arrangements are not only highly diverse but also change over time.

The empirical analysis will be carried through the application of the theoretical model in Quality Programs developed by two exporting beef processors which operate in whole country. The analysis focuses industries classified as subsystems A. Specifically; they are herein called **Alpha** and **Beta** industries. The Quality Beef Programs are basically organized with the purpose of carcasses classification and grading in which a set of products attributes are evaluated. According to Felício (1999), a carcass classification grid system allows: i) the classification - grouping into classes according to criteria such as sex, maturity and weight of the animals and; ii) the typification – class hierarchy according to the same criteria plus or not of others such as conformation and fat cover. The Brazilian cattle carcasses classification grid, established by Ministerial Decree n° 612/89, emphasizes the maturity as a criterion of quality. Besides, others criteria for animal maturity are sex, conformation, fat cover and animal weight⁸.

In the researched industries, the quality attributes considered in their programs are: i) the animal sex (male, female and castrated male), ii) the animal maturity (number of

⁸ The maturity is measured by the number of permanent incisor teeth - 2,4,6 and 8 teeth - and a subjective evaluation of the animal shape profile shows its muscle development, which may be convex, subconvex, straight, substraight and concave. Animals considered as convex express greater muscle development and concave animals, lower development. The cattle finishing process is a subjective evaluation of fat thickness (subcutaneous or cover) and it may be absent, low (1 to 3 mm), medium (3 to 6 mm), standard (6 to 10 mm) and excessive (greater than 10 mm).

permanent incisor teeth), iii) the carcass fat cover and iv) the carcass weight. The prize to be paid to producers is defined from a combination of the attributes cited above. To achieve the maximum bonus the animals must combine favorable attributes of weight, maturity and fat cover for each category of gender (sex). The prize is paid as a percentage above the market price.

For Alpha Company, there is also an additional premium of 1% to carcasses certified as EurepGap⁹ and for those originated from organic systems. The castrated males reach a maximum prize of 4% and 7% for females. The carcasses classified out of the established patterns are subject to penalties through discounts on the market price. It is important to emphasize that in this industry all the animals are slaughtered within the specifications of the quality program. There is no need to prior register within the program and after the slaughtering process finishes the producers receive a spreadsheet which certifies the animal performance.

The Beta Company does not consider the right of prize for female's animals. Only males (castrated steers and young castrated steers) are accepted in the Quality Program. The requirement of homogeneity in animal lots in Beta industry differentiates both companies. The prize is paid only to carcasses from lots which have at least 70% of the animals classified in their categories. The homogeneity level summed to other criteria - maturity, fat covering, sex and weight - allow a prize that could reach up to 6% of bonus. In opposite to Alpha industry, at Beta the animals are slaughtered considering quality attributes only when the producers apply to the Program. The Beta's Quality Program is restricted to certain regions of the country, while in Alpha the quality classification is present in all industrial units.

It is interesting to note that under beef quality programs there are no formal contracts drawn up between producers and processing industry. The standards required by industry and the levels of prizes are informed through booklets and brochures available at the firms website. Formal contracts occur in cases of advance purchase for slaughtering. In this way, prices can be set **ex ante** or **ex post**, depending on the type of contract established. Contractual clauses are related to final prices and not to quality demands for animals' carcasses. However, in *Alpha* industry - in which animal classification under the Quality Program is independent of prior registration - the formal contract for advance animal purchase presents the carcasses standard classification as an appendix.

Considering the attributes for carcasses classification, except for fat covering and animal conformation, all other variables are easy to measure (sex, weight and maturity). The evaluation of fat covering and animal conformation is carried out from technicians' subjective experience. Despite the possibility of using appropriate measurement tools, for instance special rulers for checking fat covering, they are only used in case of doubt about the evaluation outcome.

According to the industry, the challenge in implementing quality programs is related to the difficulty in establishing prizes that really incentive the production of quality animals. According to them some beef cuts even those from premium carcasses do not receive differential prices paid by consumers. Indeed, some of the beef cuts do not receive any prize from consumers, which represent a difficulty in establishing one general percentage to pay to producers as an incentive for quality. Moreover, as the quality of beef results from a range of

⁹ O EUREPGAP – **European Retailer Produce Working Group - Good Agricultural Practices**– is a quality certification system, involving questions of good agricultural practice, animal welfare, social and environmental responsibility.

interdependent attributes, it is hard to create an incentive structure that encompasses all the factors demanded for the production of a premium beef in accordance with the interests of the processing industry.

The farmers in their turn question the effectiveness of these programs provided that the investments done in order to produce quality are not rewarded adequately by the industry. The producers consider the spreadsheets which demonstrate the reward prices a complex mechanism to guarantee differentiated prices. Actually, for them it is an opportunity to industry to exercise its market power. Besides, they argue that the final quality of beef depends on a number of factors such as those related to industrial processing and the conditions of storage and transport. So, from producer's point of view, quality is not only his or her responsibility as the industry tries to impose.

7. Final conclusions

Quality is a demand of national and international consumers. Health, traceability and organoleptic characteristics - color, taste and texture - are related to the perception of quality. Beyond technological issues, organizational aspects are crucial in granting quality and coordination aspects assume an important role. Quality Programs coordinated by the beef industry represent an initiative to achieve more efficient organizational forms. However, when assessing the duration of these programs it becomes clear that the task is not a trivial one. Designing an appropriate structure of incentives is the challenge posed to these programs. This paper is based on the Theory of Incentives and Transaction Cost Economics and it shows that quality production is a multidimensional task involving a set of specific investments and each one represent a possibility of capturing quasi-rents. All the risks involved should also be considered as an important variable in the theoretical model.

Considering quality as a multidimensional concept and the necessity of specific investments for its production, it's identified imperfect institutional arrangements in Quality Beef Programs. The complexity of drawing efficient structures of incentives makes difficult the maintenance of these programs. The problem is that some beef cuts even those derived from awarded carcasses are not rewarded in a linear form by the consumer market. Some cuts don't receive any differentiated price and this compromises the establishment of a prize to be paid to producers. Moreover, the quality results of a set of interdependent attributes which confers complexity to create compensation structure that incentivizes the production in a balanced form in accordance to the processing industry interest. The producers, for their turn, question the effectiveness of these programs since the final quality of the meat also depends on a set of factors related with the industrial processing and the conditions of storage and transport. They also consider the compensation model as confused and complex, realizing that it is all about an exercise of market power. The legal institutions have a preponderant role to play, in special, allowing that both parts propose clear standards for carcass standardization and classification.

All these uncertainties create a risk perception, hindering the establishment of formal contracts and maintaining a distrustful relationship between production and industry. Therefore, investments in producing animals with quality attributes are not properly encouraged by the industry and those who accept to do it are in risk of value capture. Given this, the institutions have a role to play in order to help establishing an efficient incentive structure, beyond guaranteeing the requirements of health - livestock and the industrial processing – and satisfactory conditions throughout the cold chain.

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