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Farmer's perception of transaction costs in vertical integration schemes: The case of poultry producers in Rio Verde (Goias, Brazil)

Paulo Alexandre Perdomo Salviano[a] and Alcido Elenor Wander[b,c]

a IFGoiano – Campus Iporá, Av. Oeste, s/n (saída para Piranhas-GO), 76200-000 Iporá-GO, Brazil.
b Brazilian Agricultural Research Corporation (Embrapa), Rodovia Goiânia / Nova Veneza, Km 12 – P.O. Box 179, CEP 75375-000 Santo Antônio de Goiás, GO, Brazil. Email: alcido.wander@embrapa.br.
c Faculdades Alves Faria (ALFA), Av. Perimetral Norte, 4129 - Vila João Vaz, CEP 74445-190 Goiânia, GO, Brazil.

Introduction

Since 1997, the municipality of Rio Verde-GO, poultry production has been considered an alternative add value to grains produced in the municipality of Rio Verde (Goias, Brazil). Crop based protein (soybeans) and energy (corn) are converted into animal protein (poultry and pigs). The setup of the processing plant of "Perdigão Agroindustrial" in the Southwest Region of Goias state created new economic development opportunities through enabling new income opportunities for small and middle size farms and accessing new markets. The region became nationally prominent in food processing. Processing plants moved towards the sources of raw materials (grains) in order to reduce transaction costs, taking advantage of (a) favorable environmental conditions; (b) proximity of grain producing areas; and (c) remarkable tax incentives.

The poultry industry in this context provides the possibility of generating wealth and jobs directly and indirectly. It also acts in a very dynamic, requiring constant attention regarding factors affecting their competitiveness. In this sense, the contractual relations between actors have to be seen as fundamental condition for efficient production and ensuring productivity. Contractual relations exist to make the whole chain feasible and to satisfy the participants of the production chain. Thus, this study focusing on analysis of contractual transactions in broiler production in the county of Rio Verde-GO can be justified by the following aspects: a) the importance of poultry production local, state and national level, and its synergy with grain chains; and b) the attraction of industrial plants to the state of Goiás due to tax incentives and the existence of comparative advantages in the production process.

Chain agents (farmers and food processing industry) enter into a market relationship linked with a long-term contract. Therefore, our aim was to analyse this contractual relationship from vertically integrated farmers' perspective, by using a Transaction Cost Economics (TCE) approach to describe relevant aspects of their dependence to the integrating food processor. In this sense, we analysed the different types of contractual relations existing within the vertical integration of production, evaluated the types of agreements between the processing sector and their suppliers of raw materials, and from the perspective of integrated farmers we identified the reasons that led to the economic agreements signed between the parties.

Several authors discuss the issue related to the reason for the existence of the firm. However, Coase (1937) did the main contribution with "The Nature of the Firm". Zylbersztajn (2000) considered that Coase's work established a new conceptual orientation as a determinant to explain the creation

and existence of an organization. Organization is no longer seen as a relation of production only, but as a set of contractual relations, the so-called New Institutional Economics. Since 1970, the understanding of changes of firm structures and organizations are discussed.

With Coase's theory, the conceptual understanding of Economic Theory and the Theory of Organizations was improved. This new methodology is useful for understanding the structure and functioning of organizations. According to Coase, these contractual relationships can occur between or within firms. However, it is necessary to analyze that any contractual relationship will require a coordinating organization. In this case, it was observed that vertical integration model contractual relations are coordinated by food processors. They have a major responsibility with the final product, which represents a great opportunity for processors to impose their rules and possibilities of negotiations with potential raw material providers (farmers).

In theoretical conceptualization of Transaction Cost Economics (TCE), there were works done empirically by several authors as Coase (1937), Williamson (1971, 1996), North (1994), Zylbersztajn (1995, 2000), Farina et al. (1997), just to mention a few. These authors made significant contributions to a better understanding and even to definition of methodological procedures to explain the theoretical elements that are directly and indirectly related to TCE. Therefore, authors use two analytic categories: (a) behavioural assumptions and (b) attributes of transactions. The behavioural assumptions are related to bounded rationality and opportunism. The attributes of transactions include asset specificity, frequency and uncertainty. The definition of these analytical categories is the central part of the analysis of contractual relationships of vertical integration in poultry production.

The analysis from the TCE perspective through the governance structure based on organizational elements provides more suitable contract costs, enforcement of property rights, monitoring, performance and organization of activities or adaptation of the desired production model (Williamson, 1996). According to Fiani (2002, p.296), "transaction costs can be defined as costs that agents face every time they turn to the market. More formally, transaction costs represent the costs of negotiating, drafting and enforcing a contract".

This study aimed to analyze the contractual relationship between processing industry and farmers, using a Transaction Cost Economics (TCE) approach to describe relevant aspects of producer's perception of dependence to the contracting processor. In this case, contractual relations are coordinated by food processors.

Material and Methods

This explanatory and qualitative study generates research knowledge and reflections of market practices by seeking for a better understanding of occurrences of certain transactions in the field of agribusiness without focusing on quantification of the results and use of statistical models. In a first step, we did a literature review. We considered the two classical analytic categories: (a) behavioral assumptions (bounded rationality and opportunism) and (b) attributes of transactions (asset specificity, frequency and uncertainty). In a second step, we carried out a survey to collect primary data about the subject. From a population of 78 farmers that are vertically integrated to the food processor, we randomly selected 40 farmers (51%) and interviewed them. The survey was based on a questionnaire with questions seeking to capture the degree of dependence of farmers after signing a vertical integration contract with the food processor.

In order to ensure a representative sample we used the equation $n = \frac{(N.n_o)}{(N+n_o)}$, where N represents the population size and no the first estimation of sample resulting from the equation $n_o = \frac{1}{(E_o)^2}$, where E_o represents the sampling error. This enabled a more robust sampling size.

Results and Discussion

Our results allow us to suggest that the elements that were included into the vertical integration contract contribute to reduce the production and transaction costs. This confirms, at least partially,

the central hypothesis of TCE. In other words, changes in the structure of governance that manages the transaction between poultry producers and processors are efficient responses to the growth of specificity due to dedicated assets, as proposed by Coase.

The behavioral assumption bounded rationality seems to fit well in the analyzed production scheme, due to errors and or questions about contracts between economic agents. In this assumption emphasizes the lack of full rationality of the agents in the definition of contracts, given the complexity of the goals of each contractual relationship.

This methodological assumption makes clear the impossibility to foresee all situations inherent to a contractual relationship. In this regard, it is noted that this relationship is unilateral in defining the contract by industry. This could bring harmful effects to the process since the integrated farmer may feel hurt and thus terminate its commitment as broiler grower. Table 1 illustrates this, showing that formatting and discussion of the vertical integration contract is not in full understanding of the parties.

Table 1. Number of farmers having access to their rights and obligations before signing the vertical integration contract.

	Farmers	
Level of access	Number	%
Full access before signing	2	5
Almost full access before signing	12	30
Access to main clauses before signing	26	65
Sum	40	100

Source: Field research.

Table 2 shows the condition of the integrated farmers regarding knowledge on the standard remuneration sheet, as well as the mathematical formulas used to determine the standard remuneration per produced broiler batch.

Table 2. Access to knowledge about the formulas to determine values of farmer remuneration.

	Farmers	
Level of access	Number	%
Full access	2	5.0
Partial access	9	22.5
Only access to final result	29	72.5
Sum	40	100.0

Source: Field research.

The assumption of opportunistic behavior is complementary to the reasoning of TCE, being considered by several authors, the situation in which some agents use to benefit themselves when identifying a major bounded rationality of the related party. In this sense justifies this reasoning because sometimes the integrated farmer is considered only as an instrument of production in the model of integration and in other situations itself as not working properly in the integration process due to his condition as producer only.

According to Williamson (1996), the asset specificity can be defined in the determination of six evaluation methods: locational, physical, human, dedicated, brand and temporal, which are followed by parameters in our study. In Table 3, there is a determination of the degree of asset specificity in terms of theoretical parameters determined by Williamson (1996), based on relevant criteria of analysis from the perspective of the integrated farmers.

The asset specificity has different dimensions:

a) *Locational specificity:* Average level of specificity based on the determined maximum distance of 70 km from industrial plant. This geographically limits the number of farmers potentially having access to this activity. This is a restriction imposed by the industry due to the high transportation costs;

b) *Physical specificity*: High level of specificity as the product strongly dependent of a standardized raw material as guarantee of productive and economic efficiency;
c) *Human specificity:* Average level, despite the activity requires high production technology and well trained labor force; the labor can be trained quickly, if literacy is available;
d) *Dedicated specificity:* High level, through the difficulty in replacing the infrastructure as well as the difficulty in adaptation of the infrastructure to other uses or activities;
e) *Brand specificity:* High level, because it is linked to a brand well known in the market, i.e. high level of standardization and product quality;
f) *Temporal specificity:* High level, it is a live product and strictly determined production criteria by time of fattening. This attribute determines the level of economic efficiency of the asset.

Table 3. Matrix to determine the degree of specificity of the asset "broilers" in the vertical integration contract in Rio Verde (Goiás, Brazil).

Asset specificity parameter	Level from integrated farmer' perspective		
	Low	Average	High
Locational		X	
Physical			X
Human		X	
Dedicated			X
Brand			X
Temporal			X

Source: Parameters defined by Williamson (1996); Matrix defined by the authors based on a vertical integration contract in force.

Conclusions and Outlook

Our key findings are that changes in the structure of governance that manages the transaction between poultry producers and processors are efficient responses to the growth of specificity due to dedicated assets. From farmer's perspective, there is a certain lack of information about the content of the contracts. This may enable some kind of opportunistic behavior of contracting processor. However, the vertical integration contract significantly reduces producer's risk. We conclude that farmer's dependence to processors is high on specialized small-scale farms and low for more diversified and larger farms.

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