Perspectivas Contemporâneas
Revista eletrônica de ciências sociais aplicadas.
ISSN: 1980-0193

COMPETITION: Swine Chain Performance and Efficiency

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ABSTRACT

The purpose of this research is to analyze how the performance of agents integrating the pork system in western Paraná-Brazil is influenced by the presence of strictly coordinated systems. This research considers the interactions between agents integrating strictly coordinated structures in the swine production system of Paraná-Brazil. Based on the asymmetry of performance between pork producers and the processing segment, even under the guidance of the latter, this paper considered two complementary theoretical frameworks: Transaction Cost Economics and Industrial Organization. Results showed that certain elements constituting "structure-conduct-performance" paradigm are capable of influencing the survival and growth of producers. Thus, although different performance levels were obtained, producer performance appears to be sustainable, based on the diversification of properties and maintenance of links to processors.
Key Words: Strictly coordinated system; Swine industry; Transaction costs.

RESUMO

O objetivo desta pesquisa é analisar como arranjos estritamente coordenados localizados na região Oeste do Paraná-Brasil, influenciam no desempenho de agentes do segmento produtor de suínos que integram esses sistemas. Tomando como pressuposto a assimetria de desempenho entre os agentes produtores, a análise do desempenho se deu por intermédio do estudo complementar de duas correntes teóricas: a Economia dos Custos de Transação e a Teoria da Organização Industrial. Para isso, utilizou-se de trabalho empírico de natureza qualitativa e descritiva, que envolveu produtores e processadores de carne suína. Como resultado identificou-se que os elementos do campo "estrutura-conduta-desempenho" são capazes de influenciar a sobrevivência e o crescimento de produtores. Assim, embora apresentem níveis diferenciados, o desempenho do produtor se apresenta sustentável nos últimos cinco anos, pautado na diversificação produtiva e manutenção do vínculo com o processador.
Palavras-chave: Subsistema Estritamente Coordenado; Produção de suínos; Custos de Transação.

INTRODUCTION

Market interactions involving agrifood chain agents are a complex research field, presenting wide possibilities for theoretical development. In order to promote such scientific improvement, this research is directed to the comprehension of performance in the pork chain, considering the economic analysis of a phenomenon named performance.

According to a report by the Ministry of Agriculture, Livestock and Supply (MAPA), pork meat is considered the world's main source of animal protein, representing almost half of global meat production and consumption. In Brazil, pork meat accounted for 15,25% of national meat consumption in 2012 while beef accounted for 37,22%, according to data by the Brazilian Institute for Geography and Statistics (IBGE, 2012).

Pork production has undergone substantial changes in recent years, including chain reorganization and professionalization of the production process. Those changes involve technological advances, increased exports and changes in consumption habits, leading producers to invest in handling, genetics, nutrition and animal health in order to improve productivity (ABIPECS, 2011). Thus, new arrangements have emerged along pork chain, such as strictly coordinated systems, in order to deal with process continuity and integration in the processing segment. In that case, interdependency brings the need for efficient coordination and governance of production. Hence, the study of strictly coordinated systems considers the impact of specific governance structures on producers, binding their actions and limiting negotiations with buyers.

The aim of this work is to analyze the functioning of swine producers in Paraná, considering monopolistic characteristics involving strictly coordinated systems. Theories supporting this study include Industrial Organization (IO) and Transaction Cost Economics (TCE). IO lends support to evaluate relationships among agents, considering markets, institutions and processes. TCE, on the other hand, brings a micro analytical perspective to the study, considering the firm's behavior as a function of transactions.

Structural changes in the pork chain and their operational and competitive consequences, as well as the importance of understanding their reflexes on coordination among agents under IO and TCE approaches, support the following objective: to analyze how the performance of swine producers integrating the pork system in western Paraná state is influenced, considering the presence of strictly coordinated systems.

THEORETICAL FOUNDATIONS

This article is structured to create a logical and didactic sequence for understanding the phenomenon, involving Industrial Organization (IO) and New Institutional Economics (NIE) approaches – the latter comprising TCE. They will be presented and analyzed for a deeper understanding of these theories, and the discussion will be complemented by considerations on the Strictly Coordinated Subsystem, a model by which all agents in this study are involved.

INDUSTRIAL ORGANIZATION

Changes in North American regulatory agencies and antitrust policy in the earlier 20th century generated a large research agenda for IO (FARINA et al., 1997; SAES, 2009). Aiginger et al. (1998) stated that IO was the first to consider the existence of product differentiation, economies of scale, large companies transacting in the market, among other aspects that did not concern microeconomics. The scope of IO, as proposed by Scherer and Ross (1990), is to analyze market processes in order to identify

how they can guide firms' activities to meet consumer demand and, from that, understand the reasons for failure and propose alternative corrections. Farina et al. (1997, p. 20) observe that "the concern about market power consequences and its determinants remains the central aim of IO".

On the other hand, as pointed out by Coase (1991), the real purpose of IO is to determine which forces are responsible for industrial organization, how such forces change over time and what changes can be expected, considering this power in the organization. Within the scope of IO, considering competitive pressures, efficient market settings minimize industry costs. Thus, the theory assumes the survival hypothesis to justify its fundamental assumption, which is to maximize profits (FARINA et al, 1997).

Bain (1956) was responsible for first schematizing a model to discuss firm performance considering industry characteristics – a model named the Structure-Conduct-Performance paradigm. Industrial organization literature has shown that there is not a simple unidirectional causal relationship comprising market structure, conduct and performance of firms in the market. This is because one must consider that the competitive environment is shaped by the interaction between market structure, competition patterns and demand characteristics (JANK et al, 1999).

Kupfer and Hasenclever (2002) argue that there are two currents: the traditional and the alternative approach. Both seek answers to common questions related to business operation, coordination mechanisms, markets, among other issues. What differentiates one from the other is the meaning used to treat competition – performance for the former and efficiency for the latter. In this perspective, the traditional Structure-Conduct-Performance (SCP) paradigm falls in the traditional line of Industrial Organization. The primary model, according to Tirole (1988), brings a sense of gradation in its concept; structure determines conduct, which influences performance.

Analyzing that paradigm, Farina et al. (1997) highlighted that structure represents the essence of markets and industries in the economy, identifying their life cycle, structure, patterns of competition and consumption characteristics. To those authors, conduct refers to individual behavior to market prices, pricing, segmentation, differentiation, internal growth, among other factors. Lastly, performance evaluates company prosperity, or their growth and survival in the market.

Thus, the paradigm follows the development of the economy, analyzing market agents, products being sold, investments influencing performance, efficiency and profit distribution. Likewise, Azevedo (1998) states that the model seeks to assess the extent to which imperfect market mechanisms limit the ability of the market itself to answer the social demands of society for goods and services.

As pointed out by Scherer and Ross (1990, p. 6), "[…] not all influences flow from basic conditions to market structure towards performance. There are also important feedback effects". The new model, used in this study, can be viewed in Figure 1.

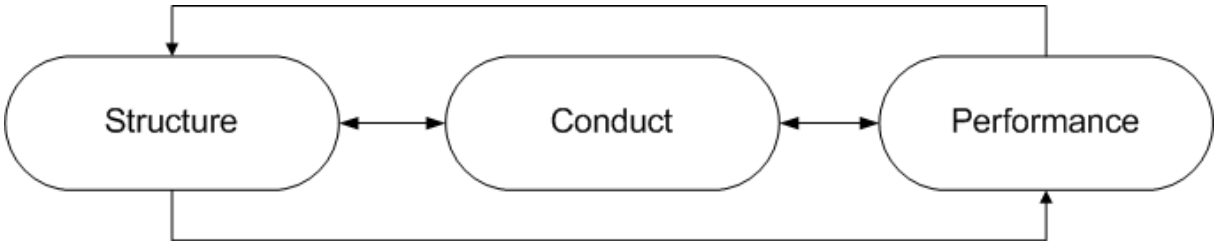

Figure 1: New approach of the Structure-Conduct-Performance model
Source: Adapted from Scherer and Ross (1990).

From the new approach of the SCP model, the research turns towards understanding the asymmetric performance of pork producers. To that end, we first need to understand how transactions are modeled and what institutional forces can be established with regard to the new resources and markets to which the subsystem is subjected.

TRANSACTION COST ECONOMICS

Contributions by Coase (1937) and North (1991) are identified from the New Economic Institutions perspective and considering the growing interest in the study of institutions and its economic impacts. Transaction Cost Economics (TCE) arises from that approach emphasizing governance structures and is especially concerned about the rules used to form governance structures supporting transactions, as pointed out by Williamson (1985), Azevedo (2000) and Zylbersztain (2009).

According to Zylbersztajn (2005) and Williamson (2013), the study of the firm's existence and the costs related to its internal organization was developed from the insights found in the articles *The Nature of The Firm* (1937) and *The Problem of Social Cost* (1960) by Coase. These insights presented the conceptual foundations to compose governance structures as alternatives to market prices. A wealth of knowledge involving TCE was developed from the studies by Williamson (1985), in which the costs related to transactions receive evidence. According to Prado and Souza (2009, p. 20), based on Coase (1991) and Williamson (1985, 1991), TCE "seeks to understand the origin of firms and more efficient organizational forms of production". As a priority, the identification of these costs associated with transactions highlights the need to create mechanisms (or, in this case, governance structures) to promote the reduction of these costs.

In TCE, transaction is the central unit of analysis, and seeks to identify the attributes related to these transactions and the costs associated with trading practices between principal-agent. It could involve marketing, trading or sharing resources based on property rights (WILLIAMSON, 1981, 1985, 2013). According to Williamson (1981), analysis of the transaction cost approach within the context of economic organizations focuses on efficiency. The measurement costs associated with these TCE characteristics considers the relationships between different dealers, including contractual arrangements for the protection of property rights, organizational coordination as well as the choice of governance structures. These structures could

involve market, long-term contracts or vertical integration (SAES, 2009).

The inclusion of opportunism and the idea of bounded rationality as essential for determining the appropriate governance structure for firms follows what Williamson (1985) indicates as behavioral assumptions. Bounded rationality indicates that individuals act in accordance with the intention rationally defined but limited to some extent (WILLIAMSON, 2013). Opportunism is identified as the advantages from the effort of others, resulting in part from bounded rationality condition in which knowledge of the information is unevenly distributed among economic actors.

Bounded rationality can somehow encourage opportunistic behavior, whereas the composition of contracts and transactions is, in general, broad and complex, and almost impossible to foresee all future contingencies in negotiations (WILLIAMSON, 1981). Opportunism in this sense arises from this perspective of asymmetric information because the agent has 'privileges' from possessing relevant information, as well as the exploitation of imperfect contracts to gain an advantage and exploit the counterparty in the transaction (KLEIN; CRAWFORD; ALCHIAN, 1978). Accordingly, it is possible to say that the choice of appropriate governance structure responds to the level of investment involved in a specific transaction, which limits market structure and indicates the need to compose hierarchical or hybrid contracts to protect against losses from opportunistic behavior.

The condition of future uncertainty is another perspective that is closely linked to the possibility of opportunism by agents. The ability to predict future conditions of the environment in which the negotiation process is also limited. Another central aspect in this discussion is the perception of quasi-rent appropriation by the parties involved in a transaction (post-contractual opportunistic behavior). The possibility of quasi-rent appropriation arises when specialized investments are made and, given the condition of dependency, real possibilities of opportunistic behavior arise. According to Klein, Crawford and Alchian (1978), the existence of opportunistic behavior is implicit in many situations, observing dependence or reciprocal relationship between the agents of a transaction. Even in conditions that are established contractual relations, the imperfection of these instruments is often reflected in opportunistic behavior in the future, generating costs from litigation to protect the right of ownership.

In Transaction Cost Economics approach, the long-term contractual solution is indicated as a way to reduce the condition of opportunistic behavior (MÉNARD, 2004; MARTINO, 2010). The contractual solution consists of rules to ensure the implementation of the transaction under agreements and prevent opportunistic initiatives, specifying the implications of hold up. In some situations, a contractual solution establishes what Klein, Crawford and Alchian (1978) call *premium*, defined as a value added to the transaction as a form of encouragement and assurance that the contract will be fulfilled in order to minimize opportunistic behavior. As variations in the format of contracts, Ménard (2004) notes that hybrid forms can flow in a continuum from forms with weak levels of integration, on one end, as trust and influence, to formal contracts, on the other end.

Thus, from the alignment of the transaction attributes with behavioral assumptions, governance is designed as a function of minimizing transaction costs, so it

is possible to identify the most efficient way to operate. One of these ways, strictly coordinated subsystems, is the model by which the farmers interviewed in this study are involved and will be presented next.

Strictly Coordinated Systems

Considering the theories and propositions of the New Economics Institutions (NEI), the entire research effort focused on the development of effective coordination of productive activities. These activities are associated with immediate and timely responses needed to maintain competitiveness in the market. Among other ways to be competitive, the strictly coordinated subsystem search efficiency by lowering transaction costs. Thus, from the understanding of the firm as a nexus of contracts, as initially developed by Coase (1937), a theoretical body supporting strategic decision making in productive activity was shaped.

From the Contract theory formulated by Williamson (1985), Zylbersztajn and Farina (1999), Zylbersztajn (2009) and Zylbersztajn and Caleman (2012) proposed a new theoretical framework, namely strictly coordinated subsystems, formatted as a governance mechanism able to coordinate a food chain. Faulin and Azevedo (2003) complement this proposal stating that subsystems coexist inside systems of greater complexity, being composed of firms that serve various activities to suit a particular purpose.

Zylbersztajn (2009, p. 61) defines the strictly coordinated arrangements keeping the transaction as the unit of analysis, and to consider the contractual nature of agribusiness systems, the importance of institutions and the strategic relationship of agents in the formation of contracts. The author then proposes in a comprehensive manner that strictly coordinated subsystems "[...] are complex organizational arrangements, involving many agents simultaneously."

As a theoretical deployment, Zylbersztajn and Farina (2003) proposed that the governance called strictly coordinated system is consolidated when a firm adopts certain strategies. However, as much as it depends on other firms to lower their transaction costs and become efficient, strategic choice can be unilateral, depending on the conditions under which firms are transacting. For the authors, what characterizes a strictly coordinated subsystem is the adoption of a differentiation strategy for a leading chain. This depends on the vertical coordination of the leading companies, and emphasizes the relationship between strategies, attributes of the transaction and governance structures. Thus, a strictly coordinated subsystem implies the existence of strong vertical ties to deal with specific assets and clarify the strategic positioning of a leader along these vertical interactions (ZYLBERSZTAJN; FARINA, 1999)

Furthermore, the authors stress that the concept of competitiveness is enhanced, from the micro level (competition between firms) to the competition between different subsystems. From a concept of chain competitiveness, Faulin and Azevedo (2003, p. 3) understand the strictly coordinated subsystem as "[...] the chain of transactions that take place to produce a final product, in which parties and counterparties are identified and ensure continuity of the relationship by a particular governance

structure". Thus, the coordination involving different companies in systems and strictly coordinated subsystems discloses an aspect for the effectiveness of such an arrangement, considering the flow of information as well as the operability of such structure.

Considering the basic attributes of transactions for TCE (frequency, uncertainty and asset specificity) and the behavioral assumptions (bounded rationality and opportunism), those structures can demand strong levels of coordination so that information flows quickly, covering the entire production structure (ZYLBERSZTAJN; FARINA, 1999). As the authors pointed out, the motivation for firms to establish strictly coordinated contracts is determined by transaction characteristics, but also by competitive pressures imposed by other coordinating agents. If, for firms taken individually, forming strategies is effective only in the medium and long term, for the strictly coordinated subsystems the idea is to combine the speed of information flow between agents and their adjustment, promoting competitiveness between different subsystems (ZYLBERSZTAJN; CALEMAN, 2012).

In that sense, considering Farina (1999), the competitive aspect can be viewed both horizontally (from firm to firm) and vertically (from firm to industry). In that case, the competitive aspect is different for different segments in relation to their density and degree of engagement between firms and specific assets. That leads to a variation even within the same segments, considering the specific involvement and attributes handled by agents.

In that sense, strictly coordinated subsystems are regarded as individual entities. As a separate entity, they may compete with each other – that is, competition becomes possible between different subsystems. As discussed above, closely coordinated systems and subsystems, given the relationship between the parties that compose them and the contractual relationship between them, became a structure that expanded the notion of firm (ZYLBERSZTAJN; FARINA, 1999). If, on one hand, subsystems monitor and create a pattern of production to compete in the market, on the other hand one has to consider the limits and difficulties that arise from those practices (CUNHA; SAES, 2005). For that reason, it is necessary to consider the mobility barriers that hinder the input and output of agents in production.

In that case, a leading company adopts a differentiation strategy, which results depend on the coordination of vertically related firms, in order to guarantee proper input supply and distribution (ZYLBERSZTAJN; CALEMAN, 2012). This arrangement has been called strictly coordinated system (SCS), emphasizing the alignment between strategies, transaction attributes and governance structures (ZYLBERSZTAJN; FARINA, 1999).

METHODOLOGICAL PROCEDURES

In order to fulfill the proposed goal, a qualitative and descriptive study was adopted. As suggested by Creswell (2007), the intention is to interpret the phenomenon. This understanding was achieved with the use of semi-structured interviews with 26 farmers involved in swine production in western Paraná state and integrated into a strictly coordinated subsystem. The interviews directed to get empirical evidences were conducted in December 2012.

The analysis of reliability is consolidated from the triangulation of data.

That is because there was interest in making an intersection of multiple points of view through the joint work of several researchers, multiple informants and multiple data collection instruments. Thus, after conducting interviews with farmers, interviews were conducted with key agents, representatives of Paraná Institution of Technical Assistance and Rural Extension (Emater) and of Farmers' Association, considering their knowledge about the producers and contractual arrangements between farmers and processors. Thus, primary information obtained from these interviews was compared, as proposed by MINAYO (2001), to increase the internal validity of the study.

The method chosen for result interpretation was content analysis, due to the need to produce inferences to its social context, following Bauer and Gaskell (2008). Therefore, content analysis was performed with the support of interviews, transcriptions, data categorization, search for convergence in the responses (content analysis) and comparative analysis of the information with the relevant literature review.

RESULTS AND DISCUSSION

Swine production consists of two major production stages: the first is called initialization (pig farming) and the second, growing phase (hog farming). Although the second stage has a larger number of farmers involved, the first is also important in the chain and must be analyzed in conjunction with the second, since the supply chain should be analyzed as a nexus of contracts, in an interdependence condition (ZYLBERSZTAJN; FARINA, 1999). Moreover, all agents are involved in the production chain and compete with other supply chains simultaneously, thus increasing the scope of competitiveness in the industry.

As expected by Zylbersztajn (2009) and Zylbersztajn and Caleman (2012), the study of transactions is complex and therefore must be assessed in a structured way. Among the reasons that hinder analyses are multiple integrated transactions, but also occurring in isolation, and the presence of multiple agents. In this context, the performance of producers was visualized by considering their permanence or continuity in the activity, i.e. their survival, and also for their growth in terms of increasing production, investments and acquisitions of other matrices.

As relationships are guided by an interdependence of agents, the processor requires constant feedback in order to adjust the interest of buyers to the production model and remain competitive in the market. This competitiveness is desired through efficiency that coordination, as Cunha and Saes (2005) proposed, the more efficient chains seek for perfect coordination. Among other functions, the swine production coordination observed seeks to convey adequately the information, incentives and absolute control over all agents connected by integration contract.

Contracts were used by processors due to the interdependence of agents and a possible need for continuous flow production. Thus, from the alignment of the transaction attributes with behavioral assumptions, strictly coordinated subsystems were configured as a more efficient form to operate governance, thus reducing transaction costs. From the definitions of

Klein, Crawford and Alchian (1978) and Williamson (1985, 1991) and subsequent expansion by Ménard (2004), Martino (2010) and Williamson (2013), the governance structure used is a contractual form. Besides that, the high level of specific assets could indicate hierarch as most suitable the contract form can reduce transaction and management costs, and answer the market demand.

Regarding frequency, it was observed that the tool used by the integrator to ensure the transaction was a contract, because it is possible to ensure continuity of production and also make it impossible for their client (producer) to negotiate with the competition (other processors). However, it was realized that the producers did not want to end contract with the processor, and the integrator has no interest in ending housing either.

That sets up a position of bilateral interests to continue production. Producers give up negotiating with other buyers to integrate by contract. The contract, in this sense, is an instrument that rules the relationship, preventing inappropriate behavior. Although this interest is on both sides of the transaction, the sustainability of these transactions is not guaranteed. There are reports of cancellations of contracts with the farmer by the integrator, and other cases in which the termination occurred voluntarily. But in all cases, the reason for the termination was agent performance.

Considering uncertainty, as proposed by Williamson (1985), Farina et al. (1997) stresses that the emergence of uncertainty is the fact that the parties involved in the transaction do not know the parameters of evaluation and monitoring of who performs the control. Thus uncertainties identified and adopted in the analysis are: waste; transport; death of animals. These uncertainties are related to the lack of clear information for farmers. The uncertainty related to the factors identified above justifies the statement by Williamson (1985) that uncertainty in a transaction is associated with the impossibility of predicting the future, creating a volatile environment to hide information and ramifications of the transaction.

The institutional regulations that drive transactions bring a sense of equality in relationships, in which there is a supplier and a buyer with interests. These interests are intensified to the extent that the specificity of assets increases. Among the specific assets devised by Williamson (1985), three were identified: human, physical and temporal assets. Management, identified as human assets, was characterized by a specific asset as it is an activity that varies from producer to producer. This confirms Farina's (2000) position that the presence of skilled labor increases the incidence of specific assets. In addition, the facilities used and the adjustments that occur throughout the production chain are considered physical assets, and increase transaction specificity. The temporal aspect was identified as involving the transport and fattening of hogs.

Thus, the notion of return linked directly to human and physical assets is shared by farmers. The interests and concerns turn to training, production diversification and constant learning, but it is extremely important to have a high reinvestment rate destined to owning property, thereby increasing performance. However, the existence of specific assets, in turn, is linked directly to the assumption of opportunism by economic agents. Therefore, the choice of strictly coordinated governance is justified, since the relationship is composed of specific

assets (hogs) that are closely linked to the end objective of the chain that is to produce pork. However, we must emphasize that the animals are specific assets from the point of view of the processor, but this position is not observed when considering the producer/integrator relationship because the swine producer, in this structure, is only a trustee.

The opportunistic action, confirming the behavioral assumption of Transaction Cost Economics, is observed in the relationship involving producers and processor. That is because there is a contract underlain negotiating parties. However, there are many agreed aspects, enabling the exercise of opportunistic actions. The first major complaint regards the measurement of their production, because there is no clear and accurate information about what is valued. Furthermore, there is no information about the impact of measured aspects for setting prices, thus configuring the consideration of animals as specific assets in production. Coupled to this condition of production, and as Williamson (1985) suggests, one must consider the condition of uncertainty arising from this particular asset.

Conversely, the condition of future uncertainty is a perspective that is connected to opportunistic agents. Thus, the proposition for contracts by Azevedo (2000) was corroborated, since producers are participating, albeit unintentionally, in the construction of governance, signing contracts with the processor. The asymmetry of information, therefore, is an inducing agent of opportunism, given the inability of information processing by the relevant producers, influenced by the competitive environment.

Like other elements of Transaction Cost Economics, opportunism and bounded rationality were also identified in the analysis. The lack of rights and duties entailed by the lack of information serve as justification for the discontent of farmers who do not understand the methodology of the system. Thus, bounded rationality, as Simon (1971) proposed, is presented by the lack of information generated due to inability to predict the second-order effects of actions and decisions taken in the subsystem.

Just as bounded rationality, opportunism has also emerged in the analysis of two strands, producer and processor. However, the opportunistic effect caused by processors was higher, generating financial impact on producers. The reason is that, while producers change handling to achieve more profit, processors set rules that must be followed. As producers do not have clear information about their rights, they simply sign contracts and consent. A conceptual model is thus formed that determines the formation of the governance structure used, which can be seen in Figure 2.

When considering the market structure, it is observed that this favors the formation of this subsystem. The study starts with an acceptance that the agents involved in SAG transact in an imperfect market. This makes room for considering the relationships of power between the agents while maintaining focus on the determinants of market influence on their performance. Thus, through a cross-sectional analysis, but with a longitudinal perspective, it was possible to understand the forces present in the market, as well as the institutions and actors that influenced the formation of the industry, providing enough information for an understanding of the phenomenon.

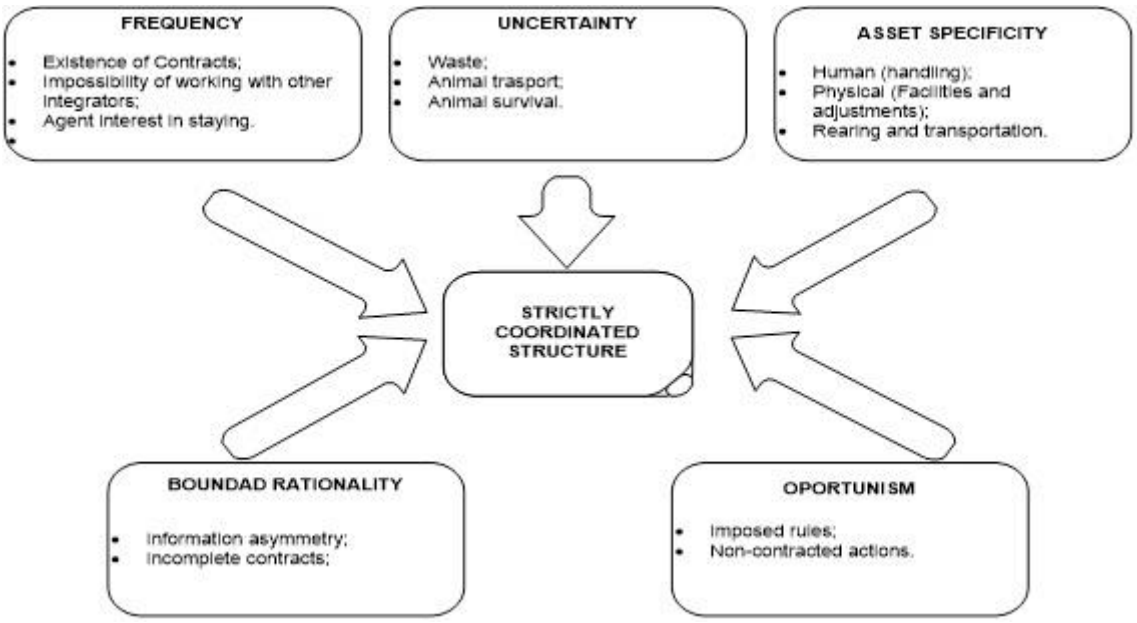

Figure 2: Alignment of the subsystem based on the attributes of the transaction and behavioral assumptions
Source: The authors

In that sense, performance is an element that influences changes because its occurrence should bring returns for at least one of the agents involved. This corroborates the literature, because the new model of SPC turns to multiple influence directions. The processor is therefore influenced, but also influences the agents in the system. Farmers work in an integrated manner to a processor in a strictly coordinated subsystem. This subsystem tends towards monopsony. Obviously, the existence of this market concentration is not explicit, but from the reports it was possible to identify some points converging to the theory.

A point raised by Stigler (1968) relates to production costs that should be borne by new entrants, but agents already established no longer need to bear with such intensity. This point is crucial because it directly correlates with the focus of the work, which is to discover how agents may differ in performance. And part of the characterization of the performance comes from the survival of the market, i.e., in this sense survival may be linked to the ability to pay these "production costs" that exist as an entry barrier.

Another factor that must be considered is market prices, which are differentiated by batch and seller. Just as Ferguson (1974) addressed the issue, prices have become, for this study, an essential item for understanding the performance of agents. When producers are not integrated, they must expend valuable part of their time negotiating products and services that serve as a basis for hog production, generating costs and burdening their production. Moreover, often producers operating independently should sell to the same processor of integrated producers, considering restrictions in the market. The price paid for the same services and products are higher, i.e. the integrator pays less, forcing down the total cost of production. However, as integrated production is subsidized by the processor, those outside

must bear all costs and still spend time negotiating their products. This generates a consensus in the field, if small farmers are working alone, i.e., independently, the results will be lower and, in moments of crisis in the segment, they cannot pay the bills and survive in the market.

Thus, including the work by Kupfer and Hasenclever (2002) is necessary, because in addition to sizing the existence of these barriers, one must adapt to the market due to these changes. This is because these changes are able to prevent the mobility of capital. Insofar as the consensus is created, people mobilize their capital and close the doors to the existence, in the short term, to other possibilities.

Another barrier that could be of great influence in performance would be product differentiation. In the vision of a development manager, interviewed for data triangulation, inputs are the same for all producers, regardless of the amount received. However, there are reports that the inputs received are different from one batch compared to the other and often are not good, resulting in low money/carcass conversion. This incidence could discourage future entrants.

Thus, from the issues that arise behind this discourse, it is possible to allocate product differentiation as a difficulty faced by farmers. Additionally, being responsible for production losses and waste formed from production, the producer must also worry about the quality of inputs and raw materials delivered during the production process.

Following the Structure-Conduct-Performance (SCP) model, the following topics in the field of market structure are discussed: number of buyers in the region, product differentiation, production costs involved and integration with the processor. In western Paraná, producers do not have much room to start integration, because when an organization starts activities in a municipality, the other is not actively working in that region.

However, when starting a contract, producers cannot transact with other processors. Thus, the already scarce options will close when they sign the integration contract. This creates a sense of lack of opportunities. Regarding product differentiation, there is not much room for maneuver because producers receive lots of integrative companies and have no power to act to change them. On the other hand, this does not prevent producers working with animals to improve their appearance and health, getting higher feed conversion at the end of housing. Thus, producers can differentiate their product through handling.

In the study, conduct was treated considering the price surveys, investments and changes in the production, in a strategic context. The three elements identified in the research as relevant to understand the performance of the agents are part of a set of factors that determine agent's behavior facing competition in the segment.

Price survey, as pointed out by Tirole (1988), was shown as a driven paradigm factor even as part of the Conduct "box". Price survey, when observed as the demand for information circulating in the industry, brings a different perspective to the producer. This view allows us to understand the opportunities in the segment, and can even facilitate negotiation with integrative company, knowing their rights and prices that are being charged in the market.

However, few farmers seek information, and when they try, they only

read the magazine provided by the integrator or company responsible for purchasing their production. The monitoring of prices in other regions was not observed for any farmer. The investments made by farmers are directly linked to the payoff in the past activity and are thus related to the agents' performance. This is because when making investments, the producer strengthens his market position in order to stay competitive in the activity by increasing production capacity, ensuring preference in the transaction. As production costs, an element of structure, investments follow the ex-ante and ex-post moments.

Before starting the housing of animals, one needs to invest in infrastructure within the property, creating spaces for holding the settling pond, building the shed, mounting ration devices, water troughs and ventilation systems. After hiring, the only expenditure is in production process adaptation and maintenance. Ex- post investments take place, mainly by changes in production.

So, ex-post production undergoes changes during the time of accommodation, by the technicians or by farmer interference. The technician performs visits during production. During these visits, some changes are required in the handling of animals. Another source of change in production occurs by the producer. In many cases, the technicians do not regularly visit the properties, making the swine producer adjust. Then, there are reports in which the change occurred endogenously.

The rights and duties of farmers is highlighted in the reports related to not knowing for sure what set of rules is their responsibility and what are not. Thus, the processing company has control over the entire production process, taking care of the accommodation, removal of animals, programming, pay system, among other elements.

The elements of performance are considered operationally in this study. In this case, their analysis was done by considering the following elements: their permanence in production, i.e., survival, growth of production in terms of increasing the quantity produced, increased investments, and purchase of other matrices.

Adaptations of a technical or strategic nature are performed incrementally during the production process, i.e., changes occur from the proposed results and improvements. From this view, performance is no longer an end and unshakable result to a constituent part of the production process to be studied. Thus, if all elements are interrelated, one must consider them in determining the performance. However, the elements that constitute the fields called "structure-conduct-performance" should be allocated according to their property, as shown in Figure 3.

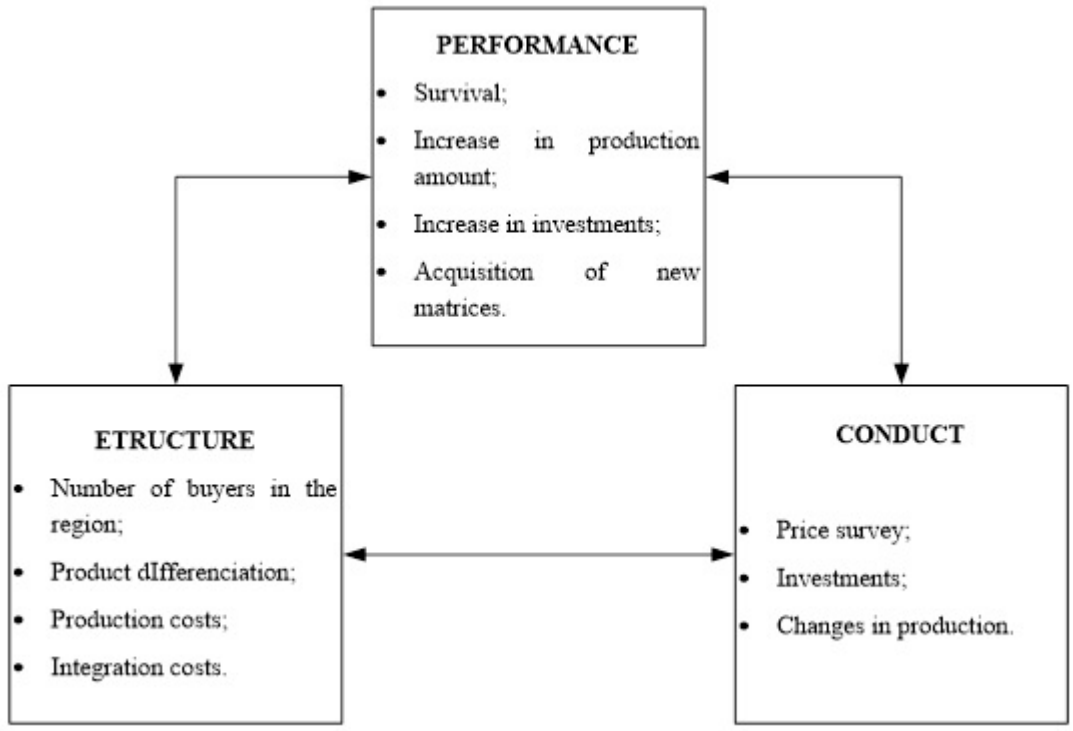

Figure 3: Elements that influence performance from the Structure-Conduct-Performance model
Source: The authors

Thus, performance configures a major element of the subsystem, able to determine the continuity of pork production. That is because, as proposed by Stigler (1968), survival – a constituent part of performance analysis – may be linked to ability to pay "production costs" that emerge from the market structure and conduct of agents. Moreover, the performance of agents is influenced by the purchase of matrices by the creators and diversification of investments – in other words, by their growth.

PERFORMANCE FROM SURVIVAL AND GROWTH PERSPECTIVES

Elements allocated in denominations (structure-conduct-performance), when analyzed together, provide a sense initially highlighted by the farmers, but during the research they were relevant to determine performance. This is because the number of buyers delimits the workspace and also, in a sense, the room for maneuver of the producers. The greater the number of producers, the greater the options of the processor and the uniformity of contracts. This limits the room for maneuver of the producer, as well as the opportunity for discussions and reallocations of resources.

Since producers are integrated, production is distinguished by the existence of formal rules and informal agreements underlain relationships. This relationship creates a kind of trust, realizing that producers are fully committed to the relationship and accept the grants coming from the integrator. Thus, the search for information other than that provided by the processor is limited, i.e., the agents do not seek to be informed properly about the changes in the activity. If we consider price,

producers mostly do not know how it behaves, much less do their weekly monitoring, maintaining a perception that prices do not change over the years.

The perception that prices are holding up over the years can be derived from an action of keeping average prices by integrators, i.e., when the market is high, they hold prices down, but when the market is low, they maintain the integrator average prices, bringing a sense of security for producers. Moreover, monitoring of prices cannot be understood as the sole determinant for the survival of the relationship, because other elements influence, such as investments and changes in production.

Although it is not the unique determinant, price control by processors creates a comfortable feeling for the hog farmers, who do not require information to transact in the market. As they need to diversify production, producers allocate part of their time to other activities, leaving the responsibility to negotiate the inputs and sale of their production to processors.

Thus, the survival of producers is conditioned on their interest in submitting to the rules of the integrator and participating in the entire production process as a "faithful" integrator. This faithful integrator, besides accepting the imposed rules, works on behalf of the group, providing quality hogs and respecting environmental laws that are enforced by the integrator. This corroborates the claims of Farina (1999) that the role of coordination and cooperation between firms (or individual subsystems) makes it possible to understand how to give adjustments and choices in order to continue participating in a strictly coordinated structure.

This structure aligns the producers to face the dynamics and competition, which they would have to bear alone if they had been negotiating out of a subsystem. The competition pattern, following Azevedo (1998), changes over the years, as new groups are formed, new demands are established and change the competitive landscape for a particular industry segment. This hampers the survival of small producers in the market.

On the other hand, performance may be understood in survival and explained by the growth of agents. When comparing the production of hog farmers in the last five years, their production has increased as time passes (an average of 63 heads per year). But the increase in productivity is slight; there was no significant increase in interviews on hogs farmers' productivity.

Integrated producers receive an average of 556 hogs from the integrator. So the risk is mitigated due to the low contribution of each swine producer. This leads to a larger number of agents to meet the demand for pork. In this way, a new indication arises of asymmetric performance. This asymmetry can be characterized by the low interest of the processor to keep producers with low production capacity, reducing their bargaining power and securing a greater number of rules to be followed.

As a complement, the second parameter of performance analysis considered the following elements: an increase in the quantity produced, increased investments in their own production and acquisition of other matrices by producers responsible for starting the production process.

Thus, from considerations of quantity produced, we identified three aspects that contribute to the asymmetry of performance: management, genetics and technology. Two of these elements, management and technology, are the

responsibility of the producer, i.e., depend on their workforce to improve their production and obtain good performance. Genetics is not part of their field, i.e., the producer depends on the integrator to deliver good animals. This creates a sense of interdependence for the production operation system, corroborating the arguments from Zylbersztajn and Farina (1999). Furthermore, this interdependence could be found in relation to other agents in the chain. For example, producers need to cooperate with neighbors for disposal of waste, but with the control of soil pH.

The elements identified above are part of a group capable of improving farm productivity through the efficiency of agents. However, investments have been made during the production process, which comes from producers looking to improve or meet the competitive standard set by the integrator.

This maintenance is not just about the product itself – swine – but also the fulfillment of the requirements that are imposed by processors. If, on one side, this charge could generate discomfort to the producer on the need to mobilize resources to improve their production, on the other side it can also mean improvements that will benefit handling, ensuring increased production capacity.

As the integrator remains interested in leaving the producers with the same pattern of production, some requirements are stipulated, as highlighted in the description of the data. But the requirements are part of the attempt to adapt to market trends and sustain improvements that are identified by the processor, preventing the mobility of producers' capital for other purposes.

Among the types of current investments in productive activity, one in particular can be highlighted, for producers who perform production initialization tasks, i.e., those who raise the hogs. For these producers, investment in new matrices is typical for this segment, because this investment can simultaneously improve genetics, increase production capacity and renew their animals. Thus, the elements identified in field growth are: management, genetics and technology (Increase quantity produced); maintaining the standard required by government environmental agencies, and requirements of the integrator (Investments); acquisition of other matrices.

The considerations of the elements that encompass the growth of agents are punctual to identify the sources of performance influence. The source, in this sense, serves to identify the links of influence that performance can provide. Thus, to facilitate the understanding of these influences, the next topic will address the sources, origin and the element that causes the asymmetry of performance.

The Origin and Elements Influencing Performance

From the design of propositions and formulations of Transaction Cost Economics and the subsequent organization of the market, the development of effective coordination of productive activities is being carried out. These activities are associated with immediate and timely responses that are needed to maintain competitiveness in the market. Among other ways to be competitive, the model seeks efficiency by lowering transaction costs. The reason is that, under certain conditions, it would be very difficult

to work through the market due to the need to maintain a productive pattern and working through vertical integration would be very expensive.

However, the interdependence of agents and the market structure emphasize the design of the strictly coordinated subsystem to maintain competitiveness in the sector. In addition to the elements that influence each other, there are specific regulations that producers must follow, categorized as institutions, as proposed by North (1991). Institutions identified (Paraná Environmental Institute IAP and integrator's regulations) design agents' actions, together with specific formal and informal regulations. Therefore, the existence of few relevant institutions for producers strengthens the role of the integrator as the holder of the production rules and information.

If, on one hand, the theoretical origin of the elements is different, on the other hand the elements are part of an empirical context. Such elements constitute the farmers' day-to-day swine production. That is because generating different performances is considered sources or elements that induce asymmetry in the performance of such producers.

The induction should be considered in terms of not having one bad and another necessarily good element – that is, producers are immersed in the same connection. From their relationships to the structure, the asymmetry is installed, which may result from the progress or growth of producers and even their exclusion from the activity. In many cases, the deletion occurs due to the inadequacy of the rules, but in others it is the result of the producer's own willingness to believe that he can make more money doing other activities.

Thus, one must ponder the degree of influence of each element, since each producer will work and will suffer the same types of influence. On the other hand, this characteristic does not bring a sense of integrator's exogeneity to the analysis. Rather, integrators are responsible for many changes in the degree of importance of each element, as they punish the producers who work under their supervision.

Note that, within the parameters established by Williamson (1985), uncertainty about the future of production hinges on relationships. For both parties, opportunistic behavior may arise from the incentives of contractual breaches. This is ratified by the observation that during the entire production process, there is supervision, regardless of the time in which producers are integrated. In addition, according to Barney et al. (2001), governance mechanisms work to minimize such incentives, while maintaining control over the unfair actions based on opportunism. As the market structure favors the creation of subsystems, the integrator limits the productive capacity of the producer and prohibits transacting with other organizations. This hinders the absorption of market information.

Within the parameters established by Williamson (1985), and as proposed by Barney et al. (2001), the development of hybrid forms as an alternative to spot market involves creating barriers or safeguards to opportunistic behavior in accordance with the intensity of negotiations established. The protection is performed from the mechanisms of contracts and agreements that are established formally and informally between the integrator and hog farmers. However, bounded rationality somehow encourages opportunistic behavior, considering that agreements and contracts are long and

complex. This makes it impossible for producers to predict contingencies during the production process, thus corroborating the propositions of Williamson (1981). For the author, such opportunism generates an asymmetry of information. In that case, the processor, using the privileges arising from possession of key information, maintains a position of greater bargaining power compared to the rural producer.

Thus, the influence of such multiple and interdependent elements determines the structure, behavior and subsequent performance of pork producers. This is because they are inserted in a context where there are specific institutions, formal and informal regulations that delimit activities, creating both benefits and difficulties for the continuity and growth of production. These activities, when analyzed under the aspect of survival and growth, create conditions favorable to performance because it suffers influence from financial, social and productive aspects, as identified in the research.

CONCLUSIONS

This paper brought a discussion about considering an economic performance focus on production agents. We aimed to discuss the configuration of the elements that influence the performance under Industrial Organization and Transaction Cost Economics, performing an approximation of approaches and subsequent analysis where theories are complementary to understanding performance.

Some elements of different theoretical origins are able to influence the survival and growth of agents in the sector. These elements are part of the daily production context and presented asymmetrically to the members of the subsystem. However, this asymmetry does not make the environment volatile – quite the contrary. The low number of institutions that producers report as being important strengthens the role of the integrator, which is to ensure the competitiveness of products in the market and subsidize the production process. This support is given for the supply of feed, animals and medicines, technical assistance, payment according to the methodology and transport to slaughter.

On the first point assessed, addressing the subsystem, it was possible to identify complex transactions between agents. This is because these transactions are strictly coordinated. Thus, considering the contract and different arrangements, it was found that the relationships are asymmetrical, i.e., the integrator prescribed different solutions to the same problem. Thus, agent performance is influenced by the way they work, bringing an endogenous character to the process whose growth is, in part, based on the adaptation of the very efficient farmer.

Adaptations, strategic or technical, are performed in a reactive way during the production process, i.e., changes occur due to the results obtained. The notion of grading the Structure-Conduct-Performance paradigm was not identified in this work, according to the multiple factors of influence identified. Thus, performance is no longer an unwavering end result, but a constituent part of the production process. The importance of the entire process performance analysis from the survival and growth agents is thus emphasized.

However, sources of influence capable of affecting the performance of the

producing agents were identified. Although these sources are part of different branches of theoretical economics, both have a high degree of complementarity due to the determination of market structures. Both IO and TCE are associated with the survival hypothesis, converging to solve the research problem of this study. These elements underlie the position that the asymmetry of performance must be understood by considering the market conditions and the ex-post transaction that is undertaken. Thus, the explanation of performance is not given only by the hog productive structure, but also by diversification strategies that every producer follows justifying their conduct as active investors to ensure their growth. As the producer cannot always invest in production, due to the release of the integrator, swine production is not presented as the only activity responsible for inducing their growth, compared to other producers, but his conduct in the agricultural activity reducing risk by diversifying with other cultures.

Although the elements are present in the transaction, the producers had, albeit at different levels, sustainable performance and growth in the five years before interviews. The good performance in this guidance can be understood from the relationship of two main factors: the diversification and increased number of animals housed. That is because the producers have their purchases guaranteed by the integrator, i.e., their income to meet the cost of property is guaranteed. However, it is through diversification that producers seek their economic well-being, because they can mitigate the risks of cultivating other crops on the property.

Although there are limitations in this study, the research provides theoretical and empirical foundations for processing and remodeling the theories used herein. New studies by entering the Cost Economics Measurement would be valuable for future research, bringing complementarity with Industrial Organization, Economics of Transaction Costs and Measurement. Therefore, new contexts could be addressed using such theories.

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AGRADECIMENTOS

Os autores agradecem o apoio financeiro da Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (Capes) e Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq).

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Enviado: 15/01/2015
Aceito: 03/11/2015
Publicado: 14/12/2015