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International Demand Shaping Governance Mechanisms in Brazilian Beef Agri-systems: The Case of the Three Main Processors

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ABSTRACT

Drawing inspiration from international institutions and how they influence American organizations and their internal arrangements, this paper discusses the emergence of coordination between beef cattle producers and processors as a transition of neoclassic market transactions to a contractual form to participate in international trade. Three case studies from the largest Brazilian processors show the rise of strictly coordinated sub-systems to address new demands that rose from export requirements. The key finding from the case studies is that institutional shocks can drive new architectures in the system because it can generate new ones, described as strictly coordinated sub-systems that demand different organizational and technical support. In addition, the cases provide findings about organizational tolerance and its relationship with different formal institutions, based on an analysis of national and international supply in quality systems.

Keywords: strictly coordinated sub-systems, beef-cattle agribusiness system, international institutions, governance strategies

JEL Code: D23, L14, Q17, Q18

1 Introduction

The Brazilian beef industry is well known globally not only because of Brazilian processors' expansion in other countries as part of their internationalization process but also largely due to their internal supply system evolution to address the global market. Beef production is one of the most protected activities in some countries, mostly because it is an activity with strong associations with political and social interests. Since the Doha Round in 2001, many protections have been reduced, and substantial reforms in the beef industry have been introduced concerning trade requirements, such as animal wellbeing, certifications and traceability (European International Center, 2003).

Although almost 80% of Brazilian production supplies the domestic market, the country is the second-largest supplier of bovine meat in the world. The heterogeneity of transactions in this particular agribusiness system (SAG) stimulated us to conduct our study on how international shocks could have provoked rearrangements in systems governance. Prior studies in the agribusiness literature have argued that different strategies and organizational governance emerge from different institutional contexts (Zylbersztajn & Farina, 1999). The authors argue that institutional shocks are related to the need of the whole system quickly adapting to the direction of a strictly coordinated sub-system (SCSS) to satisfy a specific demand. The literature suggests that the contractual system will adapt using two methods: (1) by shaping organizational strategy and (2) with formal institutions efficiently supporting supply systems to enforce coordination and help implement the necessary contractual adaptations with agents involved. However, we could see differences in coordination between systems to meet international and internal demands.

The arguments of Zylbersztajn and Farina appear relevant today with the qualification of institutional environment forces in third countries. In the light of economic and internationalization theory, changes in regulations and requirements in international trade affect the institutional environment and, consequently, the governance structure of organizations (North, 1990, Williamson, 1985). Moreover, coordination problems can be revealed when new demands arise. In fact, new requirements to produce and process some goods involve changes in technologies, mechanisms of control and incentives to coordinate agents so that new transaction forms can be observed that are not based on a pure market and that are neglected by the orthodox approach (Williamson, 1991).

This study presents the challenges in coordination that SAGs or SCSSs face with respect to fulfilling European Union requirements. In other words, it investigates *how going global affected the governance of beef systems by examining the emergence of strictly coordinated sub-systems*. To achieve that objective, it analyzed three Brazilian international companies in the beef industry, JBS, Marfrig Group and Minerva Foods, and their contract forms, adaptation processes, incentives, and administrative control based on Williamson (1991) to understand organizational strategies. The cases studies have been inspired by the idea of institutional evolution in bovine meat consumption since the creation of the WTO, rising export efforts and the rise of segmentation in the internal market.

The cases contribute to advance the literature in three ways, accomplishing the specific goals designed: (1) understanding the evolution of coordination between the European Union Strictly Coordinated Sub-System (UE SCSS) and the typical SAG through the contractual analysis, incentives and administrative controls involved; (2) understanding dependency relationships between agents and contractual adaptations; and (3) theoretical development. They refine the effect of globalization on the governance structure of supply systems—for example, how companies face opportunities to go to markets that have institutional barriers—cultural, cognitive and regulatory ones. These international requirements cause organizations to shape their strategies to coordinate themselves to meet the demands. Second, the cases help us to identify the problems in coordination resulting from a failure in designing internal institutions to satisfy external demands. Third, these ideas contribute to a better understanding of SCSS functioning (Zylbersztajn & Farina, 1999), despite the large amount of empirical work that has been performed in the last 15 years by researchers in Brazil on several agribusiness systems.

2 Background and data collection

Before describing beef Agribusiness Systems (SAGs) and the context from which they emerged, it is important to present the framework and concepts underlying the case analyses. This section also

provides a brief picture of the beef industry in Brazil based on organizational industry (OI) concepts to show how it is structured and how the companies evolved from 1990 to 2016.

The concept of Agribusiness Systems (SAGs) is an application of a firm's Coasean approach to the theory of supply systems, in search of tools to align chain studies to governance mechanisms. Governance is understood as shaping the organizational and institutional relationships that will provide efficient support to the systems and will coordinate them so that contractual adaptations are implemented in specific systems when externalities occur and share values are faced (Zylbersztajn & Farina, 1999). Once the supply system is viewed as an expanded enterprise, the concept of Oliver Williamson (1975) of hierarchy is explored because the firm is viewed not only as a nexus of contracts but also as contracts defined by their specific governance modes, which can vary between the market and hierarchy¹. Figure 1 presents the concept of the SAG.

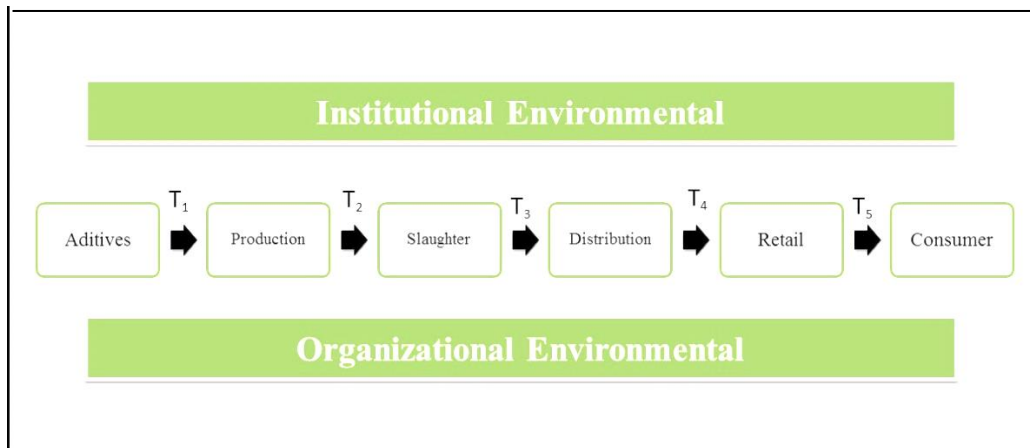


Figure 1. Agribusiness System (SAG), Source: Zylbersztajn (2000, p.14).

Considering that livestock gross domestic product (GDP) represents 31% of total agribusiness, bovine GDP represents 50% of livestock GDP. It is possible to understand the importance of this activity for the country. The two pictures of 2006 and 2016 drawn by CEPEA² show that GDP rose 107.8% in the period. The analysis of the main agents of the system shows that this SAG's performance relates to the increase in number of animals and its prices rather than to the use of inputs. Processors tripled in size in the same period, as seen in Table 1. The quantification conducted by the Beef Processors Exporters Association (ABIEC) in 2015 shows that the SAG changes by R\$483 billion, increasing by 44% over the first measure done in 2010.

Table 1.
Brazil: Bovine livestock GDP from 2006–2016 (R\$ billion).

Main SAG agents	2006	2011	2016
Inputs/additives	4.4	4.6	4.7
Production	41.8	77.0	97.8
Slaughterers/processors	20.2	40.3	60.3
Distribution/retail	36.8	43.6	51.4
Total	103.1	165.5	214.3

Source: CEPEA (2017)

¹ In agribusiness systems, the works of Davis and Golberg (1957) and Golberg (1968) are taken as references. They discuss the dependent relationships between input agents, production, transformation industry, distribution channels and the consumer.

² Advanced center of applied economics (CEPEA), established by the University of São Paulo.

Although the consumption habits of bovine meat in Brazil are historical, and in all regions of the country it is considered a basic food, poultry leads production and consumption per capita in the country. Brazilian consumption per capita (Kg) can be considered stable from 2006–2016. When we examine this consumption in relation to other markets, the Brazilian domestic is the fourth largest, behind the United States, the European Union and China. Although almost 80% of the country's production goes to the domestic market, Brazil competes with India for leadership in exports, directed primarily to under-developed countries and regions such as China and the Middle East, although the country also exports to the European Union.

The sanitary and phytosanitary agreement in 1995 and the creation of the World Trade Organization (WTO) provided the beginning of changes in quality patterns in Brazilian beef. The greatest rise in Brazilian exports was from 2000–2008, when the bovine spongiform encephalopathy (BSE) or “mad cow disease” crises affected the European Union, the United States and Canada. In the middle of 2007, Brazil was considered the largest exporter of bovine meat. However, with this external shock, developed countries began to require commercial rules, particularly before 2005 when the country faced an internal crisis of foot and mouth disease. European Union countries after BSE established quotas on imports and requirements based on feeding, traceability of the animals, animal welfare, and age.

Brazil had one of the largest herds in the world, although it was based on zebu and not taurine genetics. Moreover, the main production was not of early animals, and the country did not have a system to control the origin of the cattle. Several modifications of internal institutions were done to address this new opportunity. One modification was the “Sisbov” system created for traceability of each head of cattle, different from other Latin American countries that only trace the farms. However, the creation of new institutions does not mean that they are sufficient to coordinate the system. The coordination understood between the agents is the capacity for information transmission (Zylbersztajn & Farina, 1999).

Transaction characteristics (asset specificity, uncertainty, and frequency) stated by Williamson (1985) must be known to achieve efficiency in the coordination process (Zylbersztajn, 2000). Hobbs and Young (2000) consider that Williamson's characteristics result from product ones shaped by regulatory, technological and socio-economic-drivers—in other words, institutional environment and institutional requirements. Therefore, those characteristics influence transaction costs and the level of vertical coordination needed within a system to reduce them.

The literature of SAGs considers that three main elements are present in the constitution of a SAG: (i) contracts between firms are how hierarchies and their mechanisms of control and incentives are defined. (ii) SAG is affected by the ability to lead the internal activities between agents, and transnational transactions can be more complex due to differences between institutions. (iii) We rarely see a SAG with a single dynamic because different companies compete for resources and consumers.

Adaptation and strict coordination: a framework

Williamson (1996) proposes that adaptation capacity to shocks influences governance structure, and this influence can be autonomous or coordinated. The institutions, organizational environments and the internal relationships of the SAG change over time; thus, institutional arrangement¹ adaptation becomes necessary (Zylbersztajn & Farina, 1999). We propose that the external shocks described by Zylbersztajn and Farina (1999) can be disaggregated into three levels of change, in relation to the adaptation process:

(a) Changes in the institutional environment can be macro-analytical, such as a change in legislation, or micro-analytical, such as internal rules of the company (Farina et al., 1997). Institutional differences between countries are an example because they affect the export process. Institutional requirements must be accomplished and agents must coordinate themselves to adapt to these requirements and capture the value available in the market.

(b) Changes in the organizational environment can be considered shocks because they can modify the dimensions of the transaction, particularly specific assets and demands, because of its new rules. Monteiro and Zylbersztajn (2012) present the study case of the transgenic soybean in different institutional environments and their effect on property rights protection.

(c) The relationship between agents is a factor of change; as they exchange information and build trust relationships, new systems can emerge.

In their model applied to the flower market, Claro et al. (2005) identified two patterns between buyers and suppliers. The study shows that buyers are committed to joint actions that safeguard and coordinate specific investments. However, suppliers are influenced by flexibility and trust. This theoretical development can be also understood in Farrell (2005). The author presents how institutions can affect trust between actors and their forms of cooperation. Although his study is about industrial districts in two different countries, the role of relationships applied between buyers and suppliers can be used in supply chain studies. The approach stresses that informal institutional rules can create an equilibrium status between actors based on their behavior; this aspect is not based on Williamson's model.

In this model, buyers present requirements or patterns of behavior in the relationship involving benefits and the expectation of a long-term relationship with "smoother" forms of work. Figure 2 summarizes this conceptualization of the emergence of strictly coordinated sub-systems.

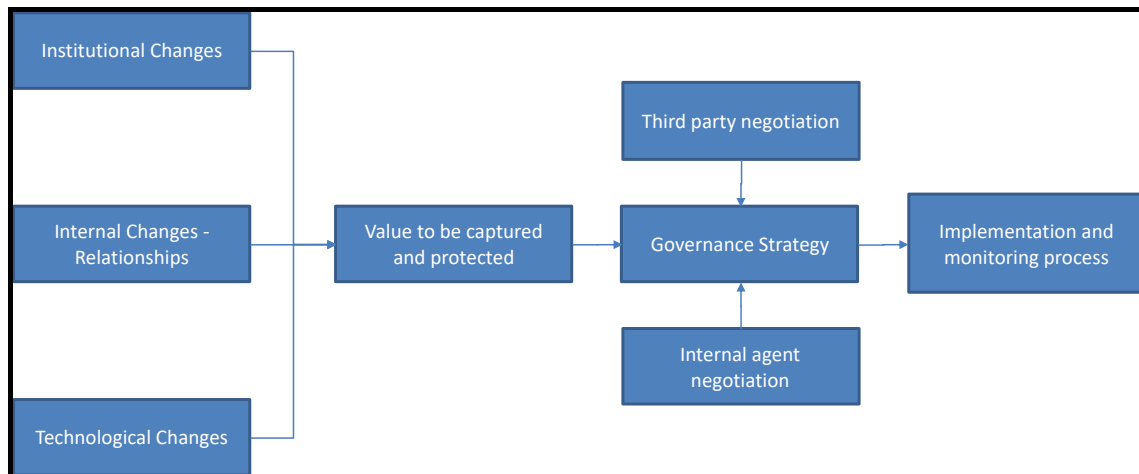


Figure 2. SCSS process of emergence.

In the SCSS emergence process, the coordinating agent, which is an internal agent of the system, has a social role in structuring the value creation and protection strategy of economic property rights through the definition of the governance structure and its coordination mechanisms.

SAG X SCSS: Limits

What are the boundaries between an SCSS and a typical SAG? Strictly Coordinated Sub-systems (SCSSs) can be viewed as a nexus of linked contracts in coordinated ways through distinct mechanisms. Three aspects are highlighted by Zylbersztajn and Farina (1999) for the characterization of these SCSSs:

- Different governance structures can be observed throughout SCSSs. Thus, for efficient management, it is necessary that incentives and control mechanisms be related to transaction costs and that considerable efforts be made to “enforce” such connections.
- SCSSs are directly affected by the institutional environment that governs them— “the rules of the game”, as conceptualized by Douglas North (1990). The issue of institutional quality and its relationship with protection mechanisms established by the Monteiro and Zylbersztajn (2012) model indicate the effect that the institutional environment has on the choice of governance strategies.

The concept of organizational tolerance² reinforces the importance of the institutional environment because it affects the degree of variability of the institutional arrangements observed to protect the property rights of similar transactions. In weaker institutional settings, in which contracts are not efficiently enforced by a legal system, the number of arrangements observed was greater. Zylbersztajn and Caleman (2009) exemplify cases of Brazilian agribusiness, explaining the diversity of governance structures among different agro-industrial systems such as ethanol, orange juice and beef. As these coordinated contract nexuses cross a country's borders, as is true of SCSSs that are formed to serve international markets, their complexity is aggravated by the necessary adaptations:

- SCSSs work as though they were a single company (hierarchy) whose internal agents' autonomy is preserved in at least one of the stages of the system. The ordering of transactions between the internal agents results from formal or informal contracts so that individual actions can be planned and implemented, in which the following are provided: (a) the characteristics of the transactions due to the specifics of assets and frequency, guaranteeing that the SCSS is able to plan for the flow of products and (b) the mechanisms of control and incentives linked to avoid ex post opportunism between the parties and ensure the implementation of the SCSS.
- Internal contracts also enable the reorganization of agents in an SCSS to occur faster than the typical SAG because of the faster flow of information. Because transactions are vertically coordinated between agents for a single goal, aligned with the competitive strategy adopted and the characteristics of transactions, the SCSS's responsiveness to environmental changes—institutional, organizational ones—is greater than to a typical system.

Thus, institutional changes established by domestic or international public policies, consumer rights, specific legislation or even changes in patterns of consumption habits in relation to a product, and technological changes and relationships between internal agents can require specific coordination mechanisms. These facts lead to investments in specific assets by the system's agents so that transaction costs increase. If the institutional environment is strong, the tendency is that system agents will be able to protect their property rights through the judicial system. Because the institutional environment is not able to protect these rights, private arrangements will emerge—the SCSS.

However, coordination costs are only justified if the system is formed for the same purposes—clear and specific ones (Zylbersztajn & Farina, 1999). In other words, producers, processors, distributors and retailers participate in coordinated systems to meet the demand for products that reflect different sets of attributes and whose property rights are transacted and protected through hierarchical structures. The proposal is that there is a delimitation between the SCSS and the typical SAG.

This delimitation occurs in the presence of mechanisms of administrative control, incentives and reputational aspects that are established in formal or informal contracts to coordinate transactions that involve investments in specific assets.

Research Design

Three major Brazilian slaughterhouses were analyzed. They were selected based on several criteria: (i) they have a transformation process as the principal activity in beef SAG. (ii) They have a managed producer relationship.; (iii) They are certificated to export to the European Union. (iv) They have access to data and people. The research was conducted based on the retail process between farmers and slaughterhouses and their interactions to inform the study and make it viable (Yin, 2010).

Data collection was performed through bibliographic research in the archives of books, journals, websites and contracts from 1997–2016 on the evolution of transactions in the agribusiness system of exports (cattle—industry—international market) in each of the companies presented and on documents of the Brazilian Association of Meat Exporting Industries (ABIEC), which show the evolution of the sector coordination. Semi-structured interviews were also conducted with company officials responsible for the areas of relationships with cattle ranchers and commercial (directors), through visits to companies and meetings. The questions for each interviewee were elaborated with the objective of searching for the history of exports to the European Union and its reflections on possible coordination for the internal market.

The protocol is in Attachment A. In addition to this strategy, as highlighted by Yin (2010), multiple forms of evidence were used to converge on the same findings. The author notes that these sources can be six: 1) documentation, 2) record on file, 3) interviews, 4) direct observations, 5) participant observations, and 6) physical artifacts. In this research, the semi-structured interviews were performed concomitantly with the observation of lectures at livestock events of the companies studied and the research of historical records (magazines, newspapers and publications of the annual reports of the companies), all characterized as secondary sources to structure the case studies. These tools and research techniques allowed the integration of multiple data sources,

which converged for data analysis (Yin, 2010). The data were analyzed using three-step case studies, following the recommendations of Yin (2010):

Understanding the evolution of coordination between the SCSS exporter and the typical SAG through the contractual analysis, incentives and administrative controls involved.

The case studies were constructed based on a chronological tabulation of the data and familiarity with their details. Other secondary data sources throughout the process were inserted until they were saturated, such as reports available online confirming the information first collected. This step consists of the general strategy of case description, which assists in the descriptive analytical framework for organizing the case (Yin, 2010). Table 2 shows the discriminant mechanisms of the governance structures used for SCSS-exporter analysis.

Table 2.
Governance Mechanisms.

<u>Competences</u>	<u>Governance Structure</u>		
	<u>Market</u>	<u>Hybrid</u>	<u>Hierarchy</u>
Private Enforcement			
Incentives	++	+	0
Management control	0	+	++
Autonomy adaptation	++	+	0
Coordinated adaptation	0	+	++
Legal Enforcement			
Contractual bases	Classical	Neoclassical	Relational

Source: Adapted from Williamson, 1996, p.105

Understanding dependency relationships between agents and contractual adaptations.

Following the recommendation of Eisenhardt (1989), intra-case analysis was used to perform an in-depth analysis of each case individually. Thereafter, the process proceeded with inter-case analyses in search of similarities and differences between the cases.

Theoretical developments.

The conclusions of each of the case studies and inter-case conclusions were compared to confirm the research hypothesis.

3 Case studies of strictly coordinated beef sub-systems and coordination with producers

The analysis of the three study cases helped to refine the concept of SCSS that was discussed by Zylbersztajn and Farina (1999) and in our propositions. Taking the model presented by Figure 2 as a starting point, a refinement was introduced addressing the social aspects that affect how these companies must coordinate their systems and how tolerant their designs are.

The analysis of the model to export to the European Union was chosen due to the number of requirements for the industry and producers to guarantee the standards of food safety and sanitation. The cases indicated that this international demand is related to new SCSSs observed in the internal market of quality meat based on specific assets (Zylbersztajn, 2005) and the hybrid governance structure.

An inter- and intra-case analysis based on discriminant variables of governance structure is provided—incentives, administrative control, contracts, and type of adaptation (Williamson, 1996). The analysis of each company transaction provides us with pictures of different structures that are articulated at the same time.

Minerva Foods – logistics-based company

Minerva's history starts in 1950 with the investment of Edvar de Vilela Queiroz in cattle transportation from farm to slaughterhouses called Expresso Barretos. Only in 1992 was the first slaughterhouse bought in Barretos; Fernando, Edvar's son, became the president based on a business plan that contemplated a company turning to export activity. The fleet of trucks from Expresso Barretos was used and constituted a distinctive feature for the company because it

permitted the supply of small and medium retailers. The expansion in other Brazilian regions started in 1999 and in South America in 2008, turning the slaughtering capacity into 5,450 per day in Paraguay, Uruguay and Colombia and 11.880 per day in Brazil. Of the three companies observed, only Minerva had no operations with other types of protein.

Governance structures

Minerva's transactions start from the balance of market necessity and financial returns. These transactions constitute the first evidence that transactions occur in the market governance structure, which could not be observed from pre-established contractual commitments and prices. All transactions occur in the spot market (internal, external and living cattle), and the contracts are not long term. The company presents exposed incentives for the European Union transactions in conjunction with the Prime Beef, 35% of the demand. The 65% represents internal and external markets that are satisfied through commodity beef.

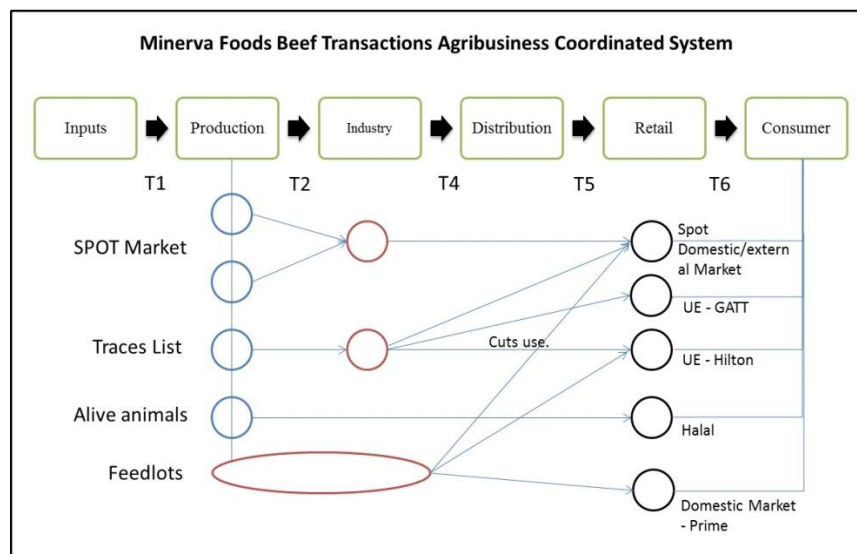


Figure 3. SAG and SCSSs of Minerva Foods.

Some different governance structures compose the sub-systems in Minerva SAG. The Prime Beef SCSS demands coordination with the producers, and the finalization of the animals is done in internal feedlots; 90% of the animals are bought through contracts. With transactions destined to satisfy European Union quotas, Prime Beef has a hybrid structure, and living animals has a hierarchical one. The others are governed by a market structure without economic incentives declared by the company.

Adaptation, Incentives and administrative control

Minerva Foods, as aforementioned, does not formally adopt the system of financial incentives to coordinate its sub-systems due to the strategy of performance based primarily on spot sales with the production directed to markets that pay more. Thus, the adaptation to market shocks consists largely of the autonomous type, performed based on the prices paid. Contractual informality is also observed; in 2015, the transactions between producers and the company were formalized through e-mail because formal contracts do not exist. The information sent is the terms agreed between them when the transaction occurs: 1) price, 2) registration data, and 3) form of payment. This measure was adopted with the intention of improving the transparency and safety in the relationships between both parties and reducing the uncertainties of the transactions between the parties.

Although contractual informality is predominant, contracts are observed to serve specific niche markets—Prime and the Hilton Beef and GATT Quotas (Europe). Adaptations are required to operate under the more demanding terms of specific internal investments, both in the company and in the animal production process, which are justified only through incentives and coordinated actions between these two agents for the delivery of a product with differentiated attributes, characterizing an adaptation of type C.

Control mechanisms are based on the requirements of each country and on those that are internal to operate under Brazilian regulation. Country licensing and regional capacity to reach the final destination with the type of cattle/beef needed to form a portfolio will be a key combination for the creation of a relationship with the producers and for the discrimination of products by destination.

Following the positioning, Minerva presents incentive mechanisms to improve the quality of the raw material base to enable a greater number of markets, in addition to reducing possible problems with opportunism concerning the delivery of the animals originating from farms registered in the Traces List. The incentive mechanisms in this relationship are not based on premiums but rather on credit (Arroba mais lucrativa⁵), guarantees of price and supply (Boi a termo⁶) and convenience of outsourcing the confinement. In these programs, the producer can participate or not participate to improve their production. Table 3 presents Minerva Foods programs and the characteristics of transactions.

Table 3.
Characteristics of governance structure of programs and transactions between producers and Minerva Foods.

Programs	Contract	Uncertainty	Incentives	Controls
Arroba mais lucrativa	Classic	+	0	Product and financial control
Boi a Termo	Neoclassic	+	Contractual clauses	Risk minimization and supply
Feedlots	Vertical Integration	++	0	Risk minimization and supply
Quota Europa e Hilton Beef	Neoclassic	+	R\$2 - 3/@ to Cota GATT + R\$2 - 3/@ to Cota Hilton	Documentation control and opportunism
Prime Beef	Neoclassic	+	1,5%–3% /@	Animal specificity control

The first economic incentives were proposed based on providing documentation on suitable farms (Traces) and suitable animals (documentation of traceability) and not necessarily on the carcasses resulting from the production process. Brazil has 1700 farms qualifying for export to the EU. However, 2016 quotas never having been fully met indicated that the existing economic incentives were not sufficient to incentivize the producer to meet the strict needs of EU demand.

The Minerva governance structure reflects the strategy of addressing external demands, specifically directed toward underdeveloped countries. However, the European Union SCSS has influenced new forms of coordination by the company and the creation of new SCSSs to address internal markets.

Marfrig Group – retail-based company

The company was created in 1986, when Marcos Molina, Marfrig's founder, started being a distributor of cattle viscera. Beginning at age 12, he helped his father at the butcher shop, and this experience encouraged him to place the first operations in Mogi-Guaçu, which later expanded to Campinas and São Paulo. Beef cattle products imported from Argentina during the Cruzado Plan (an Economic Plan in Brazil) favored the company's growth. In 1998, he placed a center of bovine meat distribution in Santo André, and the company became known for working with quality meat and noble cuts in São Paulo and restaurant chains. The first industrial plant was rented in 2000, and the expansion of operations in Brazil started. In 2007, the company started investing in operations in South America, North America and Europe. The company was a pioneer in signing a commitment with Greenpeace committing not to buy cattle from illegal and deforested areas and in having a global inventory of greenhouse gases.

Governance Structure

As Minerva Foods has the process to export to developing countries in its DNA, Marfrig Group has supplying restaurants and consumers with quality beef. The company's emergence was based on the specific demands of *Rubaya*, *Fogo de Chão* and *Outback* restaurants that demanded

coordination with production to fulfill them, such as breed specifications, type of feed, biome (location), carcass characteristics, standardization and constancy in the distribution flow.

Marfrig's governance structures emerged from different groups of specific assets to be invested and monitored (frequency and uncertainty of standardization). Its operation started with its own feedlots to supply European Union quotas and restaurants. On this structure, the firm performed the insemination of females and the finishing process in their own feedlot, characterizing a hierarchical structure motivated by a lack of structure in the system (production) to satisfy the necessities through contracts.

Exporting to the European Union represented following requirements imposed from time to time⁴, demanding industry and producer adaptation and controls. This situation changed the relationship between both parties. Examples of this process were the implementations of individual pH control, cooled-vacuum products, traceability control of animals, control of the documentation of farms enabled to export, and implementation of a structure to address the animal welfare issue prior to slaughter. The incentives were fundamental to promote the investments needed in the production phase. Figure 4 summarizes Marfrig systems.

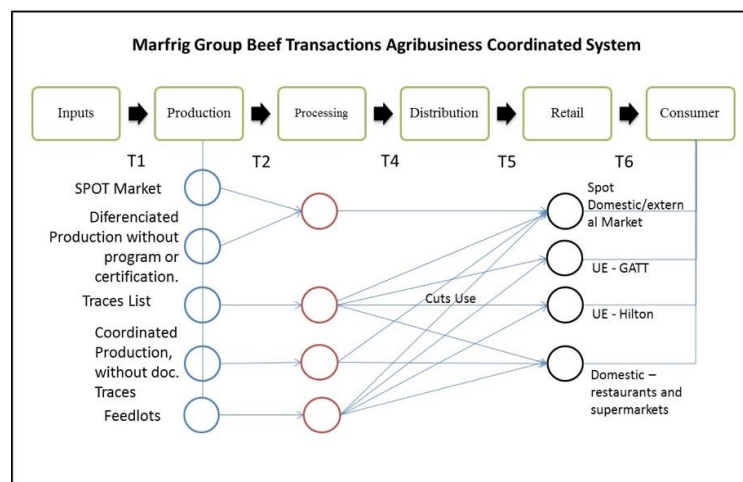


Figure 4. SAG and SCSSs of Marfrig.

Different SCSSs translate into hybrid structures through coordinated transactions through formal or informal contracts (C) because there are specific requirements such as performance in the European Union, production coordinated by the Marfrig Club and quality programs and confinements. Transactions executed via the market are considered autonomous (A).

Adaptation, Incentives and administrative control

The coordinated contracts to service restaurants and supermarkets (retail) in the domestic market launched a second challenge for the company that was not included in the SCSS exporter to the EU, regularity of supply, which can be translated into time specificity. Initially, this challenge motivated Marfrig to internalize part of the production, creating confinements and performing artificial insemination.

The lack of information on food safety and the need to disseminate good practices in the system to obtain quality products motivated the company to create the Marfrig Club⁷ in 2010, constituting the main relationship and development strategy of the system to serve its differentiated markets. The creation of the Marfrig Club and quality programs translated into organizational advances and the internal relationship of the agents of the system, allowed capturing costs and allowing system governance to be reduced, making it possible for the SCSSs to move to be served by contractual structures—hybrids, by means of controls on animal quality standards, internal processes of industry and farms; reputational, financial incentives under race development programs and documentation for participation in EU quotas or association certifications and formal and informal supply contracts. Marfrig Club is considered an informal contract in which both parties, producer and processor, establish a relationship of coordination and cooperation.

Other programs for the development of breeds through artificial insemination such as Angus and Hereford and Nelore Natural are part of Marfrig relational and quality strategic plans with

producers to guarantee high levels of supply. All of these programs are intensive in economic incentives, quality guarantees through certifications provided by associations, knowledge diffusion and loyalty. These programs induce adaptation of type C, particularly the Marfrig Club and the promotion of artificial insemination. Through the process of continuous improvement, the producers and the slaughterhouse cooperate progressively in their formal and informal contracts, aiming at increasing supply frequency and reducing uncertainties, risks and opportunistic behavior between the parties. Table 4 summarizes the program and transaction characteristics.

Table 4.

Characteristics of governance structure of programs and transactions between producers and Marfrig Group.

Programs	Contract	Uncertainty	Incentives	Controls
Marfrig Club	Neoclassic— Informal contract	+	30% to Hilton Beef animals and 15% to Cota GATT—is additional to other programs	Documentation control, associations of the product and financial
Boi a Termo	Neoclassic— formal contract	+	Contractual Clauses	Supply control and minimization of risk
Feedlots	Neoclassic— formal contract	+	0	Supply control and minimization of risk
Fomento Angus	Neoclassic— formal contract	+	0–7% do valor da arroba no Brasil central e 0–8% do valor da arroba (RS); até R\$25,00 por inseminação realizada	Associate Control and animal characteristics
Program Hereford	Neoclassic— formal contract	+	0–8%/@	Associate Control and animal characteristics
Program Nelore Natural	Neoclassic— formal contract	+	0–3%/@	Associate Control and animal characteristics

Mafrig adaptation—type C—continues to be observed in contracts with restaurants and supermarkets, in which the demands of final customers reflect the flow of information in the chain to adapt the raw material supply system. Time in this sense is the specific asset essential for the promotion of change. Contracts are designed such that they are already coordinated with the supply of animals, so that there is no stimulus for contractual breakdown or judicial disputes.

JBS-Friboi – slaughter-based company

The company was created in 1953 by the Batista Family, who owned a commercial place in the city of Anápolis. In 1957, the patriarch of the family bought the first slaughterhouse in Brasília. The business grew between 1960 and 1980, and expanded in the 1990s into other regions of the country. In 2005, the company made its first international acquisition, Swift Armour in Argentina; since then, a succession of international acquisitions was made, including other proteins, which made JBS the major protein company in the world. In 2017, several industrial plants in Latin America were sold to Minerva and other businesses to liquidate debts.

Governance Structure

The emergence of SCSSs in JBS-Friboi derives from organizational changes, although they were motivated by European Union transactions, as were the other cases. It was by studying their own internal processes and observing non-standardization of animal characteristics that the supply problems were identified and the idea of maximization of origins and destinations of the products was instituted.

The creation of the “Farol da Qualidade” program and the system of economic incentives, according to the requirements of the animals transacted, changed the company’s final products and performance. With the results of the program, the company performs as an agent protagonist of change—the coordinating agent. The creation of a payment and relationship system with producers allowed the capture of value to occur, based on the development of a relationship of transparency and reputation building. Figure 5 represents the design of the SAG and SCSSs of JBS.

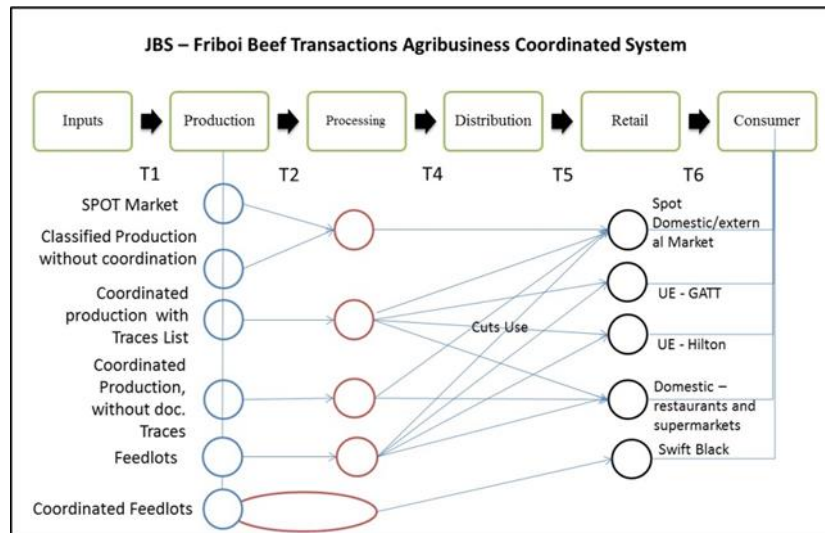


Figure 5. SAG and SCSSs of JBS-Friboi.

The two main structures of governance are market and hybrid. These structures that make up the SCSSs were made possible through quality programs, quotas and their incentives for external markets and the partial internalization of the production system.

The transactions observed in Figure 5 can be divided between the coordinates by formal or informal contracts (C) and those transactions coordinated with market prices (A), considered autonomous. The animals are used in more than one Sub-Sag, depending upon the attributes they possess, which is due to the delimitation of specific cuts that each market demands.

The creation and advance of control and incentive mechanisms, aligned with technology, has made it possible to reduce the costs of the governance structure of the SCSS exporter to the EU with the accession of fixed-term contracts, which guarantee the supply of animals within the established standards.

The Swift Black niche represents a governance structure in which the company controls the specification of animals that are purchased in the southern region of Brazil. The finishing process is performed in the internal feedlots, thus leveraging a hybrid structure whose coordination is stronger because it provides financial incentives and full control of the animal supply system.

Adaptation, Incentives and administrative control

The coordination concept diffusion on JBS-Friboi also resulted from an international perspective, sustainability evolution, and the continuous search for improving the quality of animals after the 2000s by classifying them to obtain more information about standards as an organizational process. This classification was the first step in supplying that alternated product dynamics from pull to push through market demands and their specificities.

In 2012, JBS created a relationship with a supplier's directory to focus on development of the chain and aggregate value to the stockholders. Autonomous adaptation that dominated the type of transactions was transformed to coordinated adaptations with the implementation of their own protocols of quality and the "Farol of Qualidade"⁸.

The economic incentives for quality followed the UE – SCSS: i) the formal protocol and the communication with the producer were unique, not case-by-case. ii) The quality protocol pays more to good producers and penalizes the bad ones. iii) There are places in which the protocols are not mandatory. The penalty for bad animals was implemented in 2016; in the first eight months, the "red-sign animals" decreased, and the "green ones" increased. This result indicates that the information flow and type C coordination are observed.

JBS-Friboi established the protocol initially in Mato Grosso do Sul State and established other programs to foster bovine breeds because the producers are used to classifying the carcasses based on government incentives. In this company, transactions occur in the spot market, "boi a termo", and through deals. The last are informal agreements between the industry and associations about the supply volume that they dispose. The associates are not obliged to join, but if they want to,

they must only accomplish the “Farol da Qualidade”. Table 5 summarizes the programs and characteristics of the transactions.

Table 5.

Characteristics of governance structure of programs and transactions between producers and JBS-Friboi.

Programs	Contract	Uncertainty	Incentives	Controls
Spot	Classic	0	0	Carcass characteristics
Spot – Farol da Qualidade/Angus/Quotas Europa e Hilton	Classic	+	Economics as the rules of farol da qualidade	Documentation control, associative control of the product and financial earnings
Agreements with associations	Neoclassic informal contract	+	Economics as the rules of farol da qualidade	Quality standards
Boi a Termo – Farol da qualidade/Angus/Quotas Europa e Hilton	Neoclassic— formal contract	+	As the contract agreements	Quality standards and volume of supply
Boi a Termo – no quality characteristics	Neoclassic— formal contract	+	As the contract agreements	Quality standards and volume of supply and prices
Feedlots - services	Neoclassic— formal contract	+	0	Risk control and cost control
Feedlot Swift Black	Neoclassic— formal contract	++	Informal contract, without obligations. Economic incentives as the rules established for the Rio Grande do Sul state	Associates control and animal specificity; minimization of supply risk

JBS feedlots are service providers to producers in a commercial partnership; the exception to this process is Swift Black feedlots, whose animals are brought from the state of Rio Grande do Sul to be finished internally. The transaction occurs through informal contracts, with a special economic incentive for the same state producers, because the animals have specifications of breed and feed.

The JBS-Friboi governance structure reflects the intensive process of a search for efficiency through a process of internal research and understanding. Based on studies, the created classification program allowed us to see the big picture of different SCSSs that were also motivated by the necessities of the European Union.

Inter-case analysis: a zoom on reputation and organizational tolerance

An analysis of regularities between the cases showed that the necessity to create the SCSSs-exporters to the EU represented two important roles: i) it motivated changes in national institutions to supply the internal and external markets, and ii) it encouraged the hierarchical coordinating agents to visualize new possibilities to capture value by constructing new hierarchies. Following the internal institutional environment and the trade requirements formalized by the WTO, private rules were created to meet this demand so that its attributes became easy to measure and defend. This change resulted in the emergence of an arrangement with economic property rights protected by formal rules, which makes EU-based exporting SCSSs similar to each other but heterogeneous to SAGs.

The constitution of SCSSs for the domestic and foreign markets occurred through the encouragement of organizations to promote technological diffusion and the desired animal patterns using incentives (benefits), quality programs or technical assistance (Arroba Mais Lucrativa, Marfrig Club and Farol da Qualidade) so that the investments in specific assets are

realized (risks). However, the coordination and the SCSSs' internal formation cannot be considered regular due to the presence of informal coordination mechanisms, such as the reputation among producers and companies.

In systems that coordinate with retail / distribution / restaurants, value protection initially occurred through the hierarchy. In view of the possibility of contracting and reducing uncertainties concerning the delivery of compliant animals, the structures migrated to reducing system governance costs. However, systems were also observed in which this action was not possible by locational specificities of animal husbandry, thus determining a hybrid governance structure with strong coordination observed in Prime Beef and Swift Black, with its incentives, control mechanisms and contractual formats.

The regularities and the consequences that the strict coordination necessary for the European Union supply demanded in each of the companies promoted initiatives of value capture through opportunities largely related to the internal market (strategizing⁹) and allowed better exploration of the distribution channels to optimize the beef cuts among the different markets (economizing¹⁰). The programs related to the development of races presented, in all cases, a relationship with the associations of race as certifiers, which indicates another variable related to the reputational aspects concerning origin and genetic quality.

Table 6.
Observed variables in SCSS formation through the companies' programs.

	Prime	Marfrig Club	Fomento Angus	Fomento Herford	Nelore natural	Farol da qualidade	Angus beef	Swift Back
Contract type	Formal	Informal	Informal	Informal	Informal	Informal	Informal	Formal
Incentives	++	++	++	++	++	++	++	++
Relationship between parties	Not determined	Long term	Not determined	Not determined	Not determined	Not determined	Not determined	Long term
Associations	0	0	+	+	+	0	+	+
Controls	++	++	++	++	++	++	++	++
Technological intensity	++	Develop. ++	++	++	++	Develop. ++	++	++
Specific investments	++	++	++	++	++	++	++	++

Although several programs have not presented an obligation to adopt a formal contract, "Boi a termo" is a tool adopted by all of the companies as a means of reducing risks to producers and guaranteeing supply to the slaughterhouses. Among the cases, Minerva does not have a quality promotion program based on control mechanisms, financial incentives and contracts. Their purchase relationships are made based on reputational aspects not disclosed by the company. In the case of the company, there is no explicit coordination except for the demands of the EU and Prime Beef. However, their strategies and governance structures are aligned with the positioning, as can be seen in the cases of the Marfrig Group and JBS-Friboi. This result indicates that companies focused on niche services have more SCSSs, as is true for Marfrig in relation to Minerva, which operates with market transactions. The case of JBS-Friboi market mix and their positioning in several segments is consistent with its various governance structures and the search for maximization through standardization of carcasses.

SCSSs are identified more in systems focused on niches, such as is true with Minerva; the degree of proximity between the industry and the producer concerning the internal controls of farms is greater. The framework of multiple governance structures in the firms studied indicates that the legal system protects economic property rights at a limited level and that informal and private mechanisms must be used to protect property rights. Thus, this analysis shows that the SAG of beef cattle presents a high organizational tolerance due to its innumerable arrangements, its transactions, which occur via the market, and its hybrid contracts with different levels of coordination and hierarchy examples.

4 Conclusion

The governance strategies and actions of the three largest Brazilian beef processing companies in Brazil and in the world were observed through openness to exports to the European Union (value capture opportunity) and the consequences of this process. Falling barriers, the start of exports and the trade requirements to transact with the EU are common paradigm-breaking factors in the coordination of the agro-industrial system of beef. The three cases show how the establishment of this SCSS exporter to the EU encouraged these industries to adopt the role of hierarchical coordinating agents in this case and to seek new opportunities to capture value.

The case studies also note that the mechanisms for determining governance structures are applicable to define and delimit the constitution of an SCSS with reputation verification mechanisms, which determine the separation of transactions materialized by market structures, even when negotiated without a formal contract. Multiple SCSSs observed with their private mechanisms to protect property rights indicate the high organizational tolerance of bovine SAG.

It was concluded that the company strategy also influences coordination of the system. In companies focused on serving market niches, their SCSSs present internal coordination strategies that allow their structures to approach hierarchies due to the influence of internal controls throughout the system, and contracts with strong coordination are observed. However, in companies whose prices are oriented, autonomous relationships predominate, so transactions of the generic SAG and its SCSSs occur in smaller numbers.

In the present study, the institutional arrangement is composed of the institutional environment, the SAG, the organizational environment and the SCSS, its constraints and strategies: (a) institutional changes releasing attributes in the public domain; (b) organizational changes such as new technologies, new class representation entities, shape-shifting of class entities by throwing attributes into the public domain or capture and measurement of attributes; (c) behavioral changes among SAG internal agents involving long-term relationship building based on reputation building enabling ownership rights to be captured and shared; (d) the need for new governance strategies for the strict coordination of the system through opportunities (the coordinating agent's perception of articulating a differentiated strategy); (e) different institutions that maintain the governance structure of the SCSS; and (f) support from entities involved in negotiations and warranty certifications.

From the coordination point of view, the strategies for reducing transaction costs and achieving efficiency in SAGs and SCSSs emerge through the characteristics of the transactions (g) responding to the demands of the institutional and organizational environment. (h) The coordinating agent organizes a system that differs from the SAG to meet specific demands, with a focus on balancing the distribution of property rights between internal agents and the third one to capture value, and (i) the governance strategy responds to specific institutions and the demand for certifications and technologies for its development.

This paper contributed to confirm that the use of the theory of property rights is little explored in the concepts of SAG and SCSS. This finding encourages consideration of a closer approximation of the ECT micro-analytical theories and property rights to address systemic strategic issues. The justification of this theoretical gap might be due to the complexity of the theme. However, ignoring the existence of values to be captured from differentiated niches appears inconsistent with the "real world" of organizations.

Although the SCSS-domestic market is recent, the innovative character of this research was precisely to propose the existence of an agent that acts as a hierarchical coordinator so that the SCSS emerges through the reality of the SAG, with the proposition of an efficient governance structure advancing in coordination analysis. Moving beyond the traditional discriminant analysis, an SCSS is presented through a typology that presents a set of variables and guidelines for a future research agenda, exploring each dimension of value capture and internal coordination of the System for your protection. In addition, the typology advances in dimensioning the effects of the SCSS exporter on SCSSs that have emerged in the domestic market.

As a synthesis of the suggestions that result from the analysis of the cases, the following stand out: (i) the reassessment of public policies to promote ICMS credit (conducted by Mato Grosso do Sul); (ii) the approximation of domestic regulation with international consumption trends to strengthen the reputation of the Brazilian product—in Brazil and in the world; (iii) the review of the strategy of

technological diffusion of public research companies so that they achieve greater agility with respect to producers; and (iv) the expansion of credit programs for producers that associates sustainability, pasture recovery, crop-livestock and forest integration—a national discussion to approximate practices and organizational models used by countries such as Uruguay to ensure the quality of the product throughout its system.

Among suggestions for private strategies are (i) strengthen collective actions and participation of entities as certifiers of SCSSs; (ii) increase the use of private mechanisms that configure strictly coordinated transaction security, as in the term *steer*; (iii) create Brazilian brands for niches in international markets that demand strict coordination.

Although this research is based on the SCSS exporter to the European Union and because the constitution of this system in the long term has affected Brazilian SAGs on the "emergence and capture" of value in the domestic market, Brazil is an exporter of commodities. By emphasizing this fact, the importance of the creation of Brazilian brands and the potential to be explored in terms of internal coordination, new dimensions come to exist in transnational (cultural) institutional orders and market structures that were not addressed in this research.

These absences raise questions about the supply to international niche markets by Brazilian companies but using SAGs or SCSSs from other countries that have subsidiaries. Are the lowest transaction costs and the best structures being compared? The Brazilian system is presented with recent internal SCSSs based on private rules; what is the level of organizational tolerance of these arrangements? Could they be developed to compete globally? Thus, the challenge is set forth—build a theory for the internationalization of Brazilian SAGs and SCSSs that allows analyzing transaction changes from spot market transaction to contracts, involving more efficient strategies and governance structures to capture value.

Notes

1 Institutional arrangements: The first definition of institutional arrangement was made by Davis and North (1971) as the set of rules that governs how economic agents can cooperate and / or compete. Oliver Williamson employs the term governance structure, meaning "the institutional matrix within which transactions are negotiated and executed" (Williamson, 1985, p. 105).

2 Organizational Tolerance: the variety of institutional arrangements observed for similar transactions (Zylbersztajn & Caleman, 2009). The authors propose that the greater the proportion of rights protected by formal institutions, the smaller is the variability of institutional arrangements in a hybrid form.

3 European Union Quotas: established quota that consists only of special cuts of beef, referring to the hindquarters of precocious steers. Its price on the international market is higher than other prices due to its high quality requirements (identification from birth, extensive farms and

. As stated by Williamson (1991), earnings result from eliminating the dissipation of value. classification of fat finishing conformation). Its annual quota is 65,250 tons and is fixed, with limited access by some countries that are accredited: Argentina, Australia, Brazil, Uruguay, New Zealand, United States, Canada and Paraguay. The Brazilian quota is 10 thousand tons per year, distributed among the exporting refrigerators. The GATT quota is made up of special beef cuts, referring to the hindquarters of precocious steers, also at differentiated prices. In its differentiation of the quota, Hilton is given by the specificities of production. The quota GATT is 150 thousand tons of meat in natura, and has an import value of 20% ad valorem. This quota is distributed among importers in the European Union, and such costs are passed on to consumers. The full lev meat can enter the EU with 12% of taxes and three euros per kilo exported (ABIEC, 2015)

4 See Lemos and Zylbersztajn (2014).

5 Arroba mais Lucrativa (Arroba more profitable): The objective is to foster development on farms and, at the same time, to retain the producers by giving subsidies of technical and financial knowledge so that their product improves in quality. The characteristics of the program include the advance of financial resources to producers to purchase animal food, supplements, and technical guidelines directed to obtain the animal that Minerva needs. The program does not provide for any type of contract of supply of animals or incremental financial incentives.

6 Boi a termo: Boi a termo is a controlled tool in the Stock market operated by the company in two contractual modalities: the establishment of a minimum price or value of cattle arroba through an indicator (for example, the value of the arroba provided by CEPEA—Brazilian index) and the use of market indicators. The advantage of using this tool to transact is the determination of contract price and volume "locks" that allow the stockholder to act as a risk manager, particularly when working with feedlots—which requires the supply of inputs, balancing their costs and formulas. Moreover, industry can guarantee the level of supply from the organization of its scale in the long term.

7 Marfrig Club: program of relationship with the farmer based on the principles of respect for the animal, environment and society. The objectives are to bring information on topics related to livestock production to the field and the production of safe, legal and sustainable meat so that cattle ranchers seek to innovate in their internal production and management systems to form a select group of suppliers. The program consists of classifying properties between beginner, bronze, silver, gold and platinum according to animal welfare, traceability, nutrition and sanity (animal respect); labor standards, habilitation, education and incentives (social respect) and vegetation, soil, waste and water (environmental respect). Each category presents a set of relational and financial benefits (joint adhesion with other development programs presented later) to encourage ranchers to seek the development of their properties with the technical support provided by the company.

8 Farol da Qualidade: The program was built based on demand information and internal controls, resulting in the ideal types of animals the company must serve in its diverse markets. The reward system (financial incentives) was the result of three factors: 1) learning obtained by the producer response to the incentives verified in the case of exports (farms belonging to List Traces); 2) differentiated payment for better quality animals as production stimulus and fidelity; 3) penalization of animals that are not of a minimum standard to induce improvement of the system.

9 Strategizing: When transaction costs are positive, exploring market power is a means to obtain competitive advantage (Williamson, 1991).

10 Economizing: efficiency as a basic principle of strategy.

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ANNEX A – Data collection protocol

Objective: analyze the relationship between the slaughtering and beef processing industries and the formation of Strictly Coordinated Sub-Systems (SCSS).

Part A - Characterization of the Organization

Name of organization; Founded in; Main area of activity of the organization; Current organizational structure—countries and establishment.

Part B - Characterization of the interviewees

Name; Function exercised; Duration of interview, date of interview

Part C - Characterization of the export process

- 1) Please, can you summarize the main steps the company performs to export its production?
- 2) How were the relationships with the market and cattle ranchers?
- 3) Are the confinements of the refrigerator(s) to serve a specific market?
- 4) How does the dismemberment of a transaction to serve the various markets work? Can they all serve different markets?
- 5) What restrictions exist on buying animals to serve the markets? Is there an effect on the production process?
- 6) Or does only the European Union present restrictions?

Part D - Incentives and the Market

- 1) Please discuss the evolution of this process (export) in the context of the current scenario of programs and protocols.
- 2) What were the purposes of your creation / membership? Do they only apply to the export market?
- 3) Have the programs been designed based on some standard (internal or external)?
- 4) What challenges were faced? What are the benefits?
- 5) How do relationships in the system change over time? Do these programs or protocols have any relationship?