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TRANSACTIONS IN THE DAIRY AGS: A STUDY FROM THE NEW INSTITUTIONAL ECONOMICS APPROACH ON TRANSACTION COSTS.

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1. INTRODUCTION

The Dairy agro-industrial system (AGS) has been studied in Brazil for a long time. In 1999, Jank, Farina and Galan already predicted that, in a short time, there would be reductions in the number of medium and large producers due to high costs, insufficient scale and lack of salaried labor (JANK; FARINA; GALAN, 1999). From this perspective, in recent years, several studies have been conducted aiming to understand the dairy AGS. Among them, Casali *et. al.* (2020) observed that a portion of milk producers abandoned the activity due to difficulties in meeting institutional and market demands, such as scaled production and milk quality standards. In addition, the authors also identified problems of information asymmetry between agents, especially in the case of producers who do not have any relationship with cooperatives (CASALI *et. al.*, 2020).

Furthermore, transactions in the dairy AGS are predominantly coordinated via informal agreements, which associated with information problems between producers and processing industries make room for opportunistic behavior, increase environmental uncertainties and enable the capture of rent between agents (SOUZA; BÁNKUTI, 2017). Some of these aspects are treated by Transaction Cost Economics (TCE), derived by Williamson's studies (1985), and by Measurement Cost Economics (MCE), represented by Barzel (2005). As theoretical currents derived from New Institutional Economics (NIE) theory, these assume that the macro institutional environment plays an important role in the efficiency of transactions.

Both of them discuss the main factors that influence competition between agents and efficiency of transaction. However, as Zylbersztajn (2018) argued, TCE and MCE still have some differences that justify the study of efficiency of transactions from these two perspectives. In general, it can be considered that in search for efficiency TCE focuses its analysis on governance structures, while MCE discusses the mechanisms which protect value and agents' property rights. Following Williamson (1985), who claimed that governance and measurement were interdependent this study deals with efficiency of transactions between producers and processors in the dairy AGS in Paraná.

Considering TCE, Williamson (1991) proposes that an increase in asset specificity increases transaction costs. Such costs tend to be higher when contractual structures do not align with changes in specificity, generating inefficiencies. Thus, managerial costs rise in the search for protection against the possibility of opportunistic behavior, given that a condition of interdependence is desired and an agent in better position can try to change the terms of contracts in search for greater value (WILLIAMSON, 1991). In turn, in MCE predicted that the presence of appropriation risk and poor value distribution among agents is configured as inefficiency. To MCE, the availability of information through measurement is related to guarantee mechanisms adopted by agents in search for value protection (BARZEL, 2005).

In this sense, although a transaction is considered efficient when low transaction costs are present, from TCE perspective. However, it may still have problems and inefficiencies, when considering the protection of property rights and value distribution, in MCE view, due to availability of information and the guarantee mechanisms adopted. In Barzel's (2005) proposal, measurement is able to identify these dimensions and to contribute not only to protection of rights, but also to a better value distribution among agents. These and other complementarities justify the need to analyze the efficiency of transaction by these two theoretical currents. Thus, the object of this study was the transaction between milk producers (sellers) and processors (buyers) in Paraná, seeking to observe the presence of opportunistic behavior, bilateral dependence and measurement information asymmetry.

It's important to note that macro-institutional environment in the dairy AGS is composed by normative instructions (NI) which aim to coordinate milk quality standards that must be observed in producers and dairy processing transactions (NI MAPA 76 E 77/2018). In addition, it is observed that majority of the milk producing regions, in Paraná, bases their price on the Conseleite criteria. In general, some studies consider that this price system works and serves as a basis for negotiation between producers and processors, however, it is common to observe volatility in this process, since neither producers nor industries have control over future prices, hindering the availability of this information in transaction (ACOSTA; SOUZA; BANKUTI, 2018; CARVALHO; CHAVES; ROCHA, 2020).

Furthermore, Souza and Bankuti (2017) demonstrated that even if measurement is facilitated by the regulations in macro-institutional environment, there are still problems in the transmission of information between producers and processing industries. As the authors presented, even though it is feasible, the measurement in the dairy AGS is costly because it requires complex physical, chemical and microbiological processes. In this sense, although in some cases the price is given by Conseleite Paraná and the quality standards are considered in this process, there are still problems related to the protection of economic rights and value appropriation by processing industries.

Besides that, the dairy AGS in Paraná is surrounded by high environmental uncertainties that also influence value distribution, which are related to price, production inputs and the climate, which affects production costs (MIRALES; SOUZA, 2017). Still, even in this context, it is observed that producers have sought to maximize their gains by increasing levels of knowledge and production quality (ACOSTA; SOUZA; BANKUTI, 2018). Nevertheless, one can observe transaction costs (mainly influenced by bilateral dependence and opportunistic behavior), measurement costs (arising from the requirements of normative instructions and quality monitoring), combined with this search for value protection and increase production in the dairy AGS (associated with governance structures and guarantee mechanisms).

Therefore, in this article, we sought to demonstrate that the efficiency of transaction, given by the reduction of transaction costs, can be configured differently when considering the adaptability of structures, accompanied by the possibility of establishing mutual gains between agents and value protection. Thus, the aim of this article is to understand how governance structures and the search for value protection influence transaction costs in the relationship between dairy producers and processors in Paraná.

2. THEORETICAL FRAMEWORK

2.1. Transaction Costs Economics (TCE)

As defined by Williamson (1985), TCE considers the problem of economic organization as a "problem of contracting" (WILLIAMSON, 1985, p. 20). When considering transaction costs, Williamson (1985) defines them as the friction costs of the economic system, or as the costs of negotiation and renegotiation between agents, in an attempt to protect against opportunistic behavior. As already shown, such costs cannot be eliminated and the agents have to find an organizational form that contributes to their reduction (COASE, 1937; WILLIAMSON, 1985).

Therefore, as a first step to operationalize the NIE concepts and present the TCE rationale, Williamson (2002) draws attention to the need to describe human actors in more realistic terms. Thus, the contractual man is understood from two behavioral assumptions: limited rationality – limits on the cognitive competence of individuals – and opportunistic behavior – the self-interested action (WILLIAMSON, 1895).

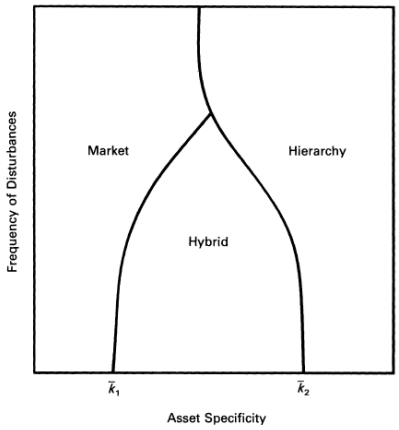
Further, three main factors are considered as transaction attributes, being frequency, uncertainties and asset specificity involved in the transaction. Among them, asset specificity is

the main factor considered for the choice of governance structures, as it creates bilateral dependence between agents and allows greater risks of opportunistic behavior, being understood as the degree to which an asset can be reallocated to a second transaction without decreasing its value. The other two attributes of the transaction are combined with the degree of asset specificity for the choice of governance structures (WILLIAMSON, 1991).

Such governance structures differ between market, hybrid forms and hierarchy or vertical integration (WILLIAMSON, 1991). As Williamson (2002) presents, each governance structure has strengths and weaknesses that combined with its characteristics and transaction attributes, justify the best way to coordinate transactions among agents. Also according to the author, governance structures differ in terms of contractual laws, adaptability to disturbances, levels of incentive and power of control. (WILLIAMSON, 2002).

In short, it is understood that the market, the hybrid and the hierarchy are polar structures and moving from market to hierarchy, agents experience a trade-off between higher level of incentives and higher level of control (WILLIAMSON, 1991). Considered as an intermediary between market and hierarchy, the hybrid governance structure has medium levels of incentives and control. Its strengths are characterized by greater ease of adaptation when compared to hierarchical structures and a greater degree of control when compared to the market. On the other hand, in situations of high environmental uncertainty, due to their higher level of bilateral dependence, hybrid structures are more subject to opportunism. Thus, in a context of high environmental uncertainties, depending on the level of asset specificity, Williamson (1991) points out that the best structure is the market at low specificity levels (k1) or the hierarchy at high specificity levels (k2), as shown in figure 1.

Figure 1 – Organization form responses to changes in uncertainty.



Source: Williamson (1991, p. 292).

Even so, although hierarchy appears as the most efficient form in a certain degree of asset specificity, Williamson (2002) draws attention to the bureaucratic costs of this structure. Thus, as a rationale for choosing structures, hierarchy is generally seen as the last option. Therefore, the author recommends to first try the market, then the hybrid and when all the others fail to reduce transaction costs (TC), to coordinate through hierarchy (WILLIAMSON, 2002).

Finally, TCE rationale is dedicated to demonstrating how governance structures differ, comparatively, according to their characteristics, strengths and weaknesses (WILLIAMSON, 1991; ZYLBERSZTAJN, 2018). In addition, the objective of this rationale is to demonstrate how the alignment between these structures and the attributes of the transactions is able to contribute to efficiency of transaction - understood as the reduction of TC arising from efforts to protect against opportunistic behavior - at the same time in which it provides order, mitigates internal conflicts and distributes gains (WILLIAMSON, 2002).

2.2. Measurement Costs Economics (MCE)

Like TCE, Measurement Cost Economics, initiated by Barzel (1982; 1985; 2005) also starts from the concept of efficiency, but has a different analytical rationale. Based on Coase (1960), MCE discussions are dedicated to establishing the mechanisms that will guarantee the property rights involved in the transaction (BARZEL, 1982). In a recent work, Zylbersztajn (2018) ratifies that the MCE assumption is that in the presence of information provided by the measurement, the value of traded rights is maximized (BARZEL, 2005; ZYLBERSZTAJN, 2018).

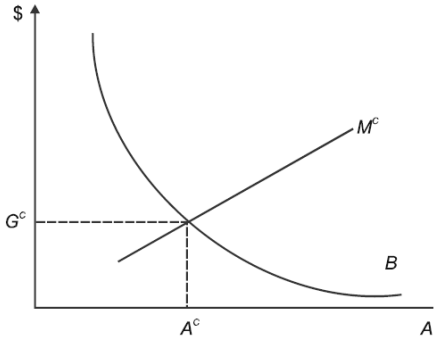
According to Foss and Foss (2000), MCE focuses in determining the ownership structure that contributes to maximize value, in situations of high measurement costs (MC). In order to determine these property rights structures, Barzel (2005) argues that, when carrying out economic transactions, agents need information about assets, in addition to information about the terms on which they will be traded. The author assumes that in the real world information is costly to produce and to transmit among agents. Therefore, it is argued that as circumstances change, individuals start to look for different types of agreements and modes of organization to guarantee, produce and transfer information between all agents involved in economic exchanges (BARZEL, 2005).

For Barzel (2005), measurement is considered as a way of providing information, which can be performed at different moments of the transaction (BARZEL, 2005; SOUZA; BANKUTI, 2017). As the author states, it can also be incomplete, making property rights difficult to be perfectly delineated. Thus, it is understood that the less information available to agents through measurement, the greater the transaction costs to guarantee economic property rights. In addition, such costs are also associated with the need for double measurement and with the withdrawal of the transaction, due to the impossibility of measurement. Thus, Barzel (2005) concludes that transaction costs are the costs to guarantee agents' economic rights.

The property rights model is a central discussion factor for MCE, which associated with measurement costs and information transmission, is important for the selection of guarantee mechanisms (ZYLBERSZTAJN, 2005). As Barzel (1997) defines, the term “property rights” carries two meanings: the first refers to the “ability to enjoy a piece of property”, nominated economic property rights; and the second is “what the state assigns to a person”, legal property rights (BARZEL, 1997, p. 6). According to the author, economic rights are the end and legal right are the means, which establishes the conditions for the protection and maintenance of economic rights. To conduct the MCE discussions, Barzel (1997) recognizes the importance of legal right, but is mainly concerned with the definition and protection of economic rights, considering that these are more difficult to be observe. In this context, legal rights actions through formal or informal protection are important to protect and guarantee economic right for both sides of the transaction (BARZEL, 1997).

In addition, discussing contractual failures intentionally or unintentionally left by agents, as Ito and Zylbersztajn (2016) explained the model in figure 2. Through this model, the relationship between specified and unspecified attributes in contract, with the definitions of legal and economic rights, is presented based on Barzel’s definitions. According to this model, in the absence of information, attributes not specified in contracts (A^c) by measurement remain only under the domain of economic rights and without the protection of legal rights offered by contracts (BARZEL, 1997; ITO; ZYLBERSZTAJN, 2016). Under these conditions, in search for value maximization, agents can appropriate economic rights without spending resources. This situation justifies the need for measurement and guarantee mechanisms that help to perfectly delineate the rights, reducing transaction costs and distributing the value between sellers and buyers (BARZEL, 2005).

Figure 2 – Competitive contracts choice.



Source: Ito; Zylbersztajn (2016, p. 9).

Thus, Barzel (2005) determines that transactions can be coordinated by various guarantee mechanisms, including long-term relations, caveat emptor and auctions, contractual relations, transfers within organization and multiple enforcers. For the author, each of these forms differs according to the need for information: in caveat emptor, information is collected before transaction; in long-term and contractual relations, sellers offer guarantees to buyers, reducing buyers' need for measurement before the transaction; and in vertical integration, information is transmitted internally within the firm (BARZEL, 2005).

In summary, in MCE rationale it is understood that when measurement can be performed at low costs, external contracts guaranteed by legal rights can be chosen. On the other hand, when measurement is costly, agents need mechanisms to guarantee and protect the value exchanged (BARZEL, 2005; ZYLBERSZTAJN, 2005). Objectively, as Barzel (2005) presents, easy to measure assets are guaranteed by contract, while difficult and costly to measure assets are coordinated by the long-term relations, depending on reputation and trust between agents. Thus in MCE view the measurement complexity influences the definition of guarantee mechanisms, also called governance structures (SOUZA; BANKUTI, 2012).

2.3. Interdependencies between TCE and MCE

As Zylbersztajn (2018) explains, TCE and MCE have characteristics in common and some differences that influence the coordination of the firm and empirical applications of the theory. Both of them aim to explain the size, scope and structure of the firm, however, as Williamson already presented in 1985, they are interdependent theories and some factors that are addressed by MCE – such as the transmission of information – are not addressed by TCE.

First, it is observed that contracts for MCE are different from contracts for TCE. As Barzel (2005) presents, contracts in MCE carry legal rights, are guaranteed by the state and requires an objective description of asset's dimensions. In turn, TCE contracts differ in classical market contracts, neoclassical contracts for hybrids and cooperation contracts for vertical integration, which do not necessarily have the enforcement by the state (WILLIAMSON, 1991).

Furthermore, according to Souza and Bankuti (2012), Barzel (2005) expands the debate on quasi-rent capture opportunities related to asset specificity and vertical integration presented by Williamson (1985). From MCE perspective, Barzel (2005) demonstrates that hierarchy is just another alternative and that standardization and the use of long-term relations are other alternatives to be considered, even with high asset specificity. For the author, the opportunity to capture quasi-rent will always exist and agents will spend resources to capture as much value as possible, characterizing a common competition movement, not only in the presence of high asset specificity (BARZEL, 2005).

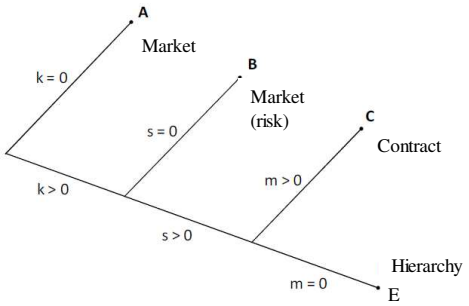
Besides that, while Williamson (1991) justifies the choice of hierarchy based on the increase in asset specificity, Barzel (2005) justifies vertical integration for better transmission of information between agents and for monitoring quality of products. Thus, considering this difference between theories, the hierarchy is chosen as the most appropriate governance

structure not only for reducing transaction costs to protect against opportunistic behavior, but also to facilitate the transmission of information when measurement is complex or impossible to be performed (BARZEL, 2005).

According to Souza and Bankuti (2012), by inserting measurement as a way to ensure legal property rights, Barzel (2005) provides a new explanation for contractual relations. For the author, the choice of contractual arrangement is only possible in the presence of guarantee mechanisms and measurable information to protect property rights. Therefore, even in situations of high asset specificity and possibilities of opportunistic behavior – which would justify vertical integration in TCE – contractual relations described by MCE is still able to protect rights (SOUZA; BANKUTI, 2012).

Based on the model shown in figure 3, Souza and Bankuti (2012) demonstrated that, in the presence of safeguards ($s > 0$), opportunistic behavior and uncertainties are reduced, resulting in a greater protection level. Considering measurement possibility ($m > 0$) and contractual safeguards, transactions can be coordinated through contractual relations even with high asset specificity, following MCE predictions (SOUZA; BANKUTI, 2012).

Figure 3 - Contractual scheme in the view of TCE and MCE.



Source: Souza; Bánkuti (2012, p. 87).

Thus, the factors which justify the choice of governance structures between vertical integration or contractual relation, can be considered from two different perspectives. On TCE side, the high specificity of traded assets justifies the choice of vertical integration as the best way to coordinate the transaction. However, according to MCE, in search for value maximization and protection of property rights, based on availability information, the contractual relation can still be considered the most efficient way to coordinate the transaction (SOUZA; BANKUTI, 2012).

Finally, discussing interdependencies on the way to efficiency of transaction, both approaches offer definitions. To TCE, efficiency of transaction relies on the alignment between transaction attributes and governance structures for transaction costs reduction and protection against opportunistic behavior (WILLIAMSON, 1991). However, to MCE efficiency is associated with the alignment between guarantee mechanisms and availability of information for protection of agents' property rights, value maximization and value distribution (BARZEL, 2005). As Zylbersztajn (2018) defines, the choice of the most efficient governance structure should be considered based on the level of asset specificity and in terms of measurement costs, justifying the use of both theories to analyze the efficiency of transaction.

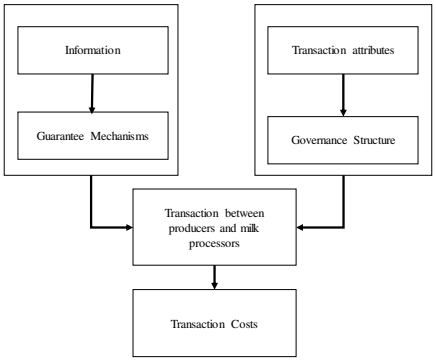
In this way, it is possible to understand that considering the existing connections between TCE and MCE, these theories complement each other in discussions on efficiency of transaction, based on the choice of the most appropriate governance structure. Thus, as a proposition of this article, it is considered that the alignment between attributes and governance structure, can contribute to reduce costs related to protection against opportunistic behavior, but still not be enough to guarantee economic rights. This proposition confirms Williamson's (2002)

definition by noting that, searching for efficiency, governance structures must be able to create order, mitigate conflicts and distribute gains between the two sides involved in exchange.

3. METHODOLOGY

To meet its general objective, this article is characterized as a qualitative, descriptive, cross-sectional study. For data collection, we conducted 30 semi-structured interviews with 18 small and medium-sized milk producers, ten processors and two key agents, one consultant and one organic milk producer who sells directly to consumers. The respondents were located in Northwest, West, Southwest, North-Central and Central-Eastern regions in Paraná. Besides, for data treatment and results analysis we used Content Analysis, proposed by Bardin (2011). The analysis categories were divided in: transaction between milk producers and processors; governance structures; guarantee mechanisms and transaction costs. These categories are represented by the model in figure 4, which seeks to describe a rationale for efficiency of transaction, according to the proposition considered by the study: to analyze efficiency of transaction between milk producers and processors, from the perspective of TCE and MCE, it is considered that the costs which result from the alignment between attributes and governance structures can contribute to protection against opportunistic behavior, but is still not sufficient to guarantee economic rights.

Figure 4 - Proposed model: rationale for efficiency of transaction.



Source: elaborated by authors based on theoretical framework.

4. RESULTS ANALYSIS

The profile of processors and producers interviewed by the study is described in chart 1 and chart 2, respectively.

Chart 1 – Characterization of the interviewed milk processors.

Milk Processors									
Processors	**Region**	**Type**	**Daily volume (liters)**	**Products sold**	**Years in activity**	**Producers**	**Relation time (years)**	**Operation**	**Branches**
1	Central North	Dairy	7000	Cheese	20	17	10	State	1
2	Central North	Dairy	5000	Milk and dairy products	25	30	10	State	1
3	Central North	Cooperative	1.300.000	Milk and dairy products	56	2.800	30	National	4
4	Northwest	Dairy	380.000	Milk and dairy products	56	250	30	National	4
5	Northwest	Dairy	700.000	Milk and dairy products	40	314	3	National	8
6	Northwest	Dairy	18.000	Icecream	25	50	6	PR; MT	2
7	West	Dairy	120.000	Milk and dairy products	20	600	10	PR; MS	2
8	West	Cooperative	600.000	Milk and dairy products	43	1.000	40	National	6
9	West	Dairy	38.000	Milk and dairy products	30	100	10	State	6
10	Central-Eastern	Cooperative	380.000	Milk and B2B trade	60	1140	15	National	12

Source: elaborated by the authors based on research data.

Chart 2 – Characterization of interviewed milk producers.

Milk Producers								
Producer	**Region**	**Property Size (h/a)**	**Space for mik production**	**Years in activity**	**Daily volume (liters)**	**Type of milk**	**Buyers**	**Relation time**
1	Northwest	3,4	3,4	10	450	Raw milk refrigerated	1	2 years
2	Northwest	149,6	19	30	800	Raw milk refrigerated	1	3 years
3	Northwest	5,4	5,4	9	540	Raw milk refrigerated	1	1 year
4	Northwest	21,7	21,7	2	50	Raw milk refrigerated	1	2 years
5	Northwest	14,9	14,9	9	500	Raw milk refrigerated	1	8 years
6	Northwest	100,6	40,8	20	750	Raw milk refrigerated	1	2 years
7	Northwest	13,6	12,2	8	200	Raw milk refrigerated	1	2 years
8	Northwest	13,6	13,6	7	300	Raw milk refrigerated	1	1 year
9	Northwest	57,1	13,6	8	1250	Raw milk refrigerated	1	3 months
10	Northwest	6,5	6,5	10	30	Raw milk refrigerated	1	1 year
11	Northwest	102	30	11	200	Raw milk refrigerated	1	6 years
12	South-west	45	22	8	6000	Raw milk refrigerated	1	3 years
13	South-west	40	40	25	3000	Raw milk refrigerated	1	6 years
14	West	39,4	39,4	20	1000	Raw milk refrigerated	1	20 years
15	West	30	30	32	1800	Raw milk refrigerated	1	6 years
16	West	20	7	30	400	Raw milk refrigerated	1	4 years
17	West	43,5	12,24	27	1500	Raw milk refrigerated	1	27 years
18	West	21	21	30	1000	Raw milk refrigerated	1	30 years

Source: elaborated by the authors based on research data.

4.1. Presentation and discussion of primary data

4.1.1. Transaction attributes and governance structure

According to the respondents and to the rationale proposed by Williamson (1985), it is observed that the transaction between producers and processors in these regions of Paraná is frequent, with a daily recurrence or at most every 48 hours. Furthermore, the presence of locational and temporal asset specificity is considered in a transaction surrounded by environmental and behavioral uncertainties. Such uncertainties occur to a greater degree related to the amount to be paid to producers, making it difficult to plan and to reinvest in the activity. This configuration, according to the TCE assumptions, indicates the need for more complex governance structures, capable of absorbing transaction costs arising from misalignments between attributes and governance structure.

In addition, it is observed that regardless of the region, transactions are coordinated in majority through informal agreements. With the exception of producer 4 in Northwest and processors 2 and 3 in North Central regions, which have a small part of the transactions coordinated by formal contract, all the rest only have an informal agreement. Such agreements are related with forms of payment, some type of price forecast and the conditions of delivery and quality, but do not offer guarantees on the amount to be paid.

It is possible to infer that the presence of these informal agreements may be associated with a condition of bilateral dependence between milk producers and processors, created by the regulations and by asset specificity. According to NI 76 and 77, refrigerated raw milk must be processed in industries, respecting the quality standards defined by the law, before being sold in final distribution. Therefore, the regulation restricts this only alternative and unless the producer distributes the milk in informal market, the processors will always be an intermediary agent before the final consumer.

Further, as Barzel (2005) already indicated, the fact that processors analyze quality, but not all of them value these standards in the price given to the producer, is characterized as a situation in which the risk of value appropriation is greater for the producer, since he does not measure and only receives the price at the payment. As Williamson (1991) argues, this configuration may indicate characteristics of negotiations in market, whose main objective is to define the monthly price paid to the producer. However, transaction recurrence between the same agents and the use of informal agreements in the dairy AGS enable coordination trough hybrid structures from TCE perspective, considering a stronger relation than in the market.

Therefore, ratifying Acosta, Souza and Bankuti (2018) and Sudré, Souza and Bouroullec (2020), this article shows that hybrid governance structure, based on the use of informal agreements and combined with some market characteristic, is adopted to coordinate transaction

between dairy producers and processors in Paraná. To TCE, according to Williamson (1991), hybrid structure is justified in this transaction by the degree of environmental uncertainties in the way it provides greater control than the market, but is still more flexible than vertical integration to adapt to disturbances. Thus, in the case of these respondents, the hybrid structure can offer greater protection than the market, better coordinated adaptation, absence of bureaucratic costs, but still have a lower power of control than the hierarchy, ratifying Williamson (1991). Chart 3 summarizes the highlights identified in the interviewees.

Chart 3 – Interview highlights according to analysis categories.

Respondents	Region in Paraná	Highlights	Analisys Categories
Processor 3	Central North	"Influences: road conditions must provide access to collection even on rainy days"	Transaction Attributes
Producer 13	South-west	"I think the biggest mistake we have is that we deliver practically 45 days of our production to find out how much will be earned. So, we are in their hands."	
Processor 2	Central North	"Most of them are drawer contracts, but the dairy honors what it promised and demands from the producer as well."	Governance Structure
Producer 15	West	"Unfortunately, this is our problem with milk, we never have a guarantee, right. What the dairy wants to pay, it pays. It doesn't change much because it's another region, we're in their hands, when they want, they pay well."	
Processor 4	Northwest	"We have a relationship of 30 years or more. It makes it easier at the time of negotiation, because the producer puts it on the scale. And also we, when it comes to exhibiting for the direction, we also put this in, so as not to lose a loyal producer, who has always been with us. And the producer also thinks a lot about leaving out."	Guarantee Mechanisms
Producer 5	Northwest	"I never insisted on that, because as they don't pay for quantity and quality, it doesn't matter because they don't value the quality of the milk. They don't look at anything, they pick it up and take it away. I think the milk is in good quality, because if it was bad they would pay even less."	
Producer 11	Northwest	"There's not a lot of negotiation because we usually accept it, there's no conversation. They pass and we accept. In recent years we gave up, because there is no opening."	Transaction Costs
Processor 9	West	"Usually they accept it, because as we pay according to the establishments nearby, there is not a big discrepancy. They see that there's not much difference, so it's not much of a problem."	

Source: elaborated by the authors based on research data.

Finally, it is important to emphasize that although the hybrid structure is a viable alternative to coordinate the transaction between agents, given the degree of uncertainty present in the activity, the absence of formal contracts can generate greater risks of value appropriation by one of the transaction sides. Such risks can be observed considering the availability of information and the guarantee mechanisms present in the transaction in addition to the governance structure. Those factors that are presented below in accordance with MCE concepts.

4.1.2. Guarantee Mechanisms

As required by normative instructions 76 and 77, measurement is mandatory in all transactions, regardless of the property size, the daily volume or even the long-term relation established between the agents. Unlike what has been defined by Barzel (2005), even if agents benefit from long-term relation, in the dairy AGS this guarantee mechanism is not responsible for reducing measurement costs because milk analysis must always occur in order to guarantee the quality standard distributed to final consumer.

In most cases, only the processor carries out the measurement and pass the information to the producer. The context of information asymmetry discussed in Barzel (2005) is identified in this AGS considering that while producers 2 and 5 do not receive information about the analyzes that buyer 6 performs, all others receive the analysis reports monthly, at the time of payment, but they do not carry out their analysis. Furthermore, as Barzel (2005) argues, agents

need both information about assets and information about the terms on which they will be traded. In this case, even though the transfer of information about the dimensions defined by the normative instructions exists, information asymmetry is related to the fact that most of the interviewed producers do not know the price to be paid during the negotiation.

It is observed that in general measurement and transfer of information are present in transaction. However, as it is performed only by the processor, it is difficult to protect property rights, making the producer dependent, with less bargaining power, and having to accept the price. In this situation, according to MCE, the risk of value appropriation, even in the presence of information, is greater for the producers, who need guarantees to protect themselves ex ante transaction.

Thus, it is identified that in this AGS the interviewed producers and processors spend resources to find potential buyers and sellers, to describe the assets transacted and to sign the contractual terms, as Barzel (1985) already described. In this search for value protection, as alternatives, agents invest mainly in long-term relations, so that most producers have a relationship of two to six years with processors. However, as highlighted by producer 13, although this condition is taken into account, it does not directly influence the price to be paid because there is no standard minimum value and even with the long-term relation, the price can still be reduced, depending on the quality and on the market average prices.

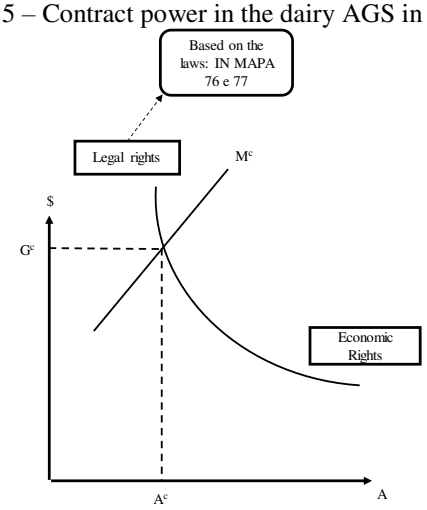
It is observed that agreements can function as promises between agents, as is expected to happen in long-term relations, according to Barzel (2005). In this case, the producers offer promises that the milk will be in the expected quality and the processors offer promises of better prices and payment within the established period. However, these agreements are informal and do not guarantee value protection, as the price of milk is only informed at the payment and not established before the transaction. Furthermore, although the theory states that the long-term relation reduces measurement costs, in the dairy AGS this is also not confirmed, given the requirement established by normative instructions 76 and 77.

Thus, it is observed that, in the search for value protection, agents use what Barzel (2005) calls multiple enforcers, namely: a. long-term relation and reputation investments; b. contractual relations, although they are tacit contracts and there are difficulties in obtaining guarantees from the state, they still offer some kind of permanence in transaction; c. Conseleite Paraná, which provides a price parameter and access to information; d. normative instructions and legal apparatus (MAPA), determining a quality standard to be followed in milk and providing rights and duties to both transaction sides.

In addition, even though in the dairy AGS in Paraná legal rights are exercised by normative instructions and by legal apparatus, ratifying the importance of the macro-institutional environment characterized by NIE, these concern only the standardized milk quality attributes and not ensure that the payment will be based on this observed quality. Thus, in the absence of formal contracts and information, the attributes not specified in contract are located on the economic rights side, as it can be seen in the model proposed in figure 5, adapted from Ito and Zylbersztajn (2016).

Through figure 5, it is observed that in the absence of a formal contract and given the dependence of producers on the information that the processor provides, the risk of value appropriation by economic rights is greater for producers. In this case, the main generator of doubts at the time of the transaction between the producers and processors interviewed in the study is what is embedded in the amount to be paid. In this AGS, according to the terms proposed by Barzel (2005), formal contract is important because it restricts value appropriation attempts, reduces costs for investment in reputational capital and reduces additional costs for value protection.

Figure 5 – Contract power in the dairy AGS in Paraná.



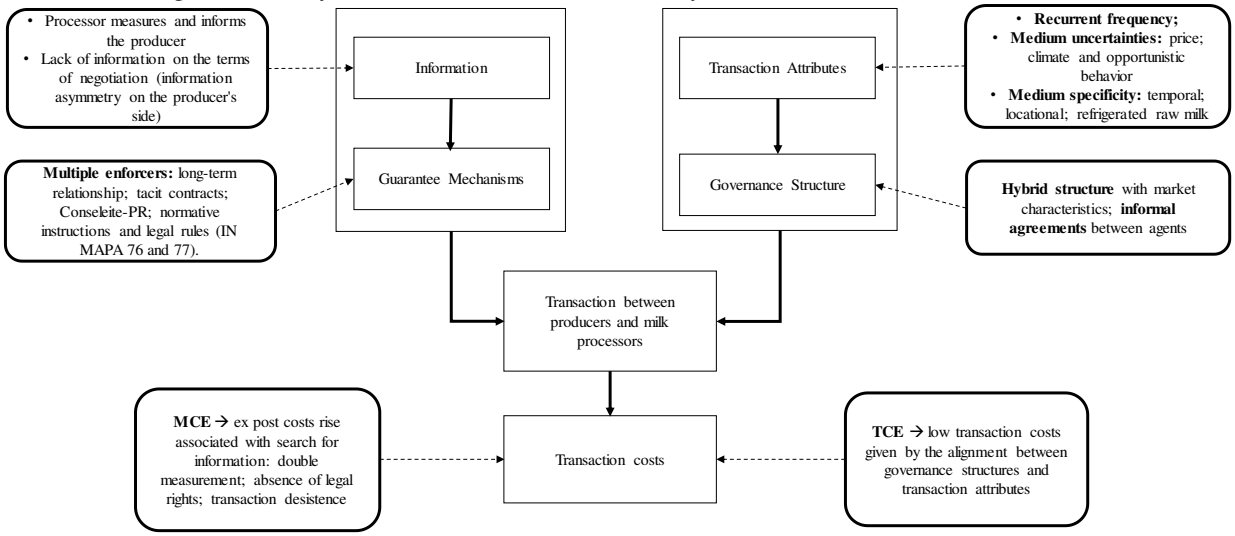
Source: adapted from Ito; Zylbersztajn (2016, p. 9).

As Barzel (2005) highlights, and is identified by the interviews, it can be inferred that in the dairy AGS, value distribution is impaired because producers partially receive the value of the asset since not all processors pay for quality, even though they all value and look for attributes such as volume, fat and protein. Ultimately, the search for economic right can generate ex post transaction costs, which may increase as agents need to renegotiate according to the price paid, influencing the efficiency of transaction.

4.1.3. Transaction Costs

In general, considering the transaction costs present in the negotiation between producers and milk processors, these costs may be associated with the search for new negotiations, the producer's search for a better price, as well as frequent adjustments in this amount, in addition to costs associated with measuring and information asymmetry between agents. These costs are observed by both sides, however, they can lead to greater loss of value on the producer's side, depending on the guarantees present. Figure 6 summarizes the key information described so far and assists in discussions of efficiency.

Figure 6 – Analysis model: transactions in the dairy AGS in Paraná from TCE and MCE view.



Source: prepared by the authors based on research data.

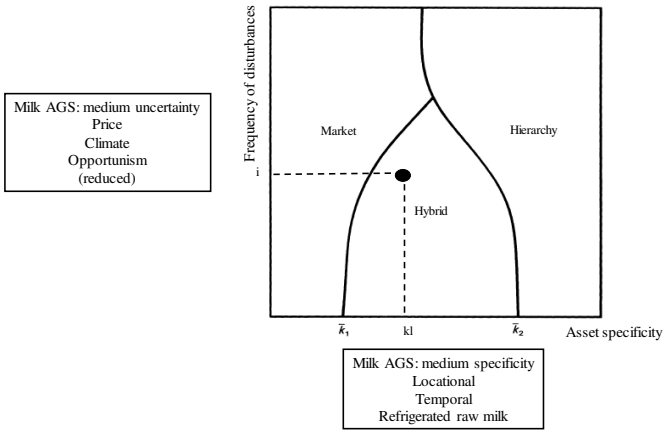
For the majority of producers, renegotiations are infrequent, being made at the time of contracting and small monthly negotiations on the price to be paid. It is observed, on the other hand, that the absence of renegotiation between agents is not only due to the alignment between transaction attributes and governance structures, as Williamson (1985) proposes. On the producers' side, as a consequence of the dependence between agents, the absence of negotiation is due to the lack of processors openness, the lack of formal and better guaranteed contracts, or even because some producers give up on the negotiation and just accept the value.

Given this, it is considered that even if the negotiation between the producers and processors interviewed is not costly and the agents get better protection in hybrid structures than in the market, as expected by Williamson's (1985) definitions, it still exists room for opportunistic behavior. Since in this AGS the transaction is surrounded by uncertainties, asset specificity and bilateral dependence, factors that can increase the risks of opportunistic behavior in the absence of information and legal rights, as provided by Barzel (1985).

Thus, considering the discussions of efficiency through TCE and MCE perspectives, it is observed that, if on the one hand the hybrid governance structure, as identified by this study and by previous studies, may be the most appropriate for adapt to frequent environmental disturbances (as proposed by TCE), on the other hand, considering value protection and the guarantee of economic rights in MCE orientation, some observations should be considered.

Analyzing the alignment between transaction attributes and governance structures in terms proposed by Williamson (1991), based on the interviews in this AGS, it is possible to infer that this takes place according to what the theory defines, as shown in figure 7. The hybrid structure is justified by the medium level of asset specificity "k1", for presenting only locational and temporal specificities and for being commercialized raw milk refrigerated, which is standard for all producers and processors. Even so, this hybrid structure is closer to coordination via market, as mentioned above, and away from vertical integration. This structure is considered to be in line with the level of uncertainties, also considered medium because they relate to uncertainties about price, climate and opportunistic behavior reduced by the existence of normative instructions, and because the price is given by the market in almost all cases.

Figure 7 – Governance structures in the dairy AGS in Paraná according to uncertainties.



Source: adapted from Williamson (1991, p. 292).

On the other hand, as Williamson indicated in 2002, on the way to efficiency, the governance structure must also contribute to create order, mitigate conflicts and distribute gains. In the dairy AGS in Paraná, it is observed that in the absence of a standard minimum price and formal contracts, even with an alignment between governance structure and transaction attributes, the order is not easily established, conflicts are present looking for better prices and earnings are not distributed between the agents. This is justified by observing that, as secondary data present and the respondents confirm, there has been a frequent exit of small producers from the dairy activity in Paraná. For the processors, this output of small producers is offset by

increased productivity in larger and more professionalized properties. Even so, this drop in the number of producers may be associated with the difficulties they face in reinvesting in the activity, which may be indicative of quasi-rents appropriation, given the losses in ex post trading.

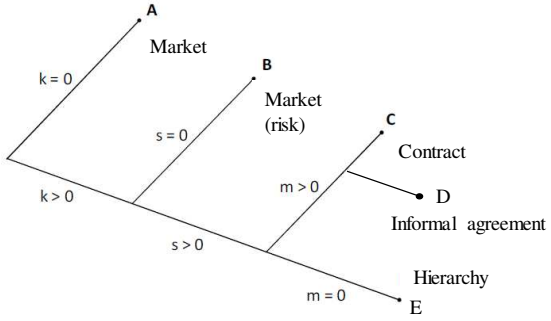
This difficulty to reinvest in the activity by producers can also be related to problems in value distribution in a context in which the producer needs to accept the value given by the processor. Furthermore, in the absence of a formal contract, a standard minimum price and other guarantee mechanisms in addition to those already presented, the producer becomes more exposed to risks of value appropriation. This situation indicates inefficiency of transaction from MCE perspective considering that as Barzel (2005) conceptualizes, transaction costs are the costs arising from the agents' efforts to guarantee economic rights.

Thus, when transaction costs are observed as a function of measurement in the dairy AGS in Paraná, it is understood that, even with the alignment proposed by TCE, these costs can still rise as agents seek the protection of economic rights, in a context of bilateral dependence and information asymmetry. In search for value protection, it was identified that the agents of this AGS resort to double measurement in some cases, to normative instructions as the only source of information guaranteed by legal right, or at the limit they give up transaction due to lack of information and trust by producers and processors.

As a result, the hybrid structures considered efficient by Williamson's (1991) models may present inefficiencies when considering the interdependencies between TCE and MCE concepts. In the dairy AGS, these inefficiencies are justified considering that only agreements and partnership are not sufficient to protect the producer's value, as Barzel (2005) already indicates in his theory. Thus, agents need to resort to the other guarantee mechanisms, combining informal agreement with long-term relations, the support of Conseleite Paraná, normative instructions and legal apparatus in attempt to achieve value distribution to both transaction sides.

In figure 8, adapted from Souza and Bánkuti (2012), we propose that the transaction between the dairy AGS producers and processors in Paraná is coordinated by informal agreements (node D), surrounded by contractual safeguards and measurement is present. In this AGS, safeguards are based on the definitions of normative instructions 76 and 77, functioning as a standard to be followed and offering guarantees to the producer that the milk will be evaluated according to this standard and enabling rights to the processor to analyze the quality of the milk. However, unlike what has been defined in Barzel (2005) and Souza and Bánkuti (2012), in the empirical field, this transaction is not coordinated through contracts guaranteed by legal rights, but through informal agreements, which offer less protection against loss of value.

Figure 8 – Contractual scheme for the dairy AGS in Paraná considering TCE and MCE.



Source: adapted from Souza; Bánkuti (2012, p. 87).

Furthermore, considering the combination of asset specificity and measurement costs, as proposed by Zylbersztajn (2018), it can be inferred that both TCE and MCE indicate the need for the transaction in this AGS to be coordinated through vertical integration. In other words, it

is justified according to asset specificity and also because measurement is costly, although feasible, considering that only the processor performs the quality analyzes and that information about the terms of the negotiation is absent. However, in this AGS the coordination is through external contracts, enforced by normative instructions and supported by guarantee mechanisms (multiple enforcers), justified by the medium asset specificity and by the fact that the measurement is possible, even if it is costly.

For this reason, the hybrid structure is justified by the alignment with transaction attributes from TCE perspective, but it still needs guarantee mechanisms for the agents to achieve better value distribution through measurement from MCE perspective. Thus, even if the theories agree on the choice of governance structures, the interdependencies between them reinforces the importance of information in the transaction, as Barzel (2005) already predicted. According to the author, in situations where access to information is costly on one side of the transaction, agents have as alternatives to increase the standardization of traded assets or establish prices according to the quality offered by the product, which does not happen in most of the cases identified by this study.

Therefore, it is understood that the choice of governance structures and the search for value protection in the dairy AGS in Paraná, may involve higher transaction costs because, as Barzel (2005) already predicted, in the absence of information and formal contracts, the costs rise. In other words, in addition to uncertainties and asset specificity, information asymmetry between agents and the absence of a minimum standard price, formed from the quality to be used as a basis for negotiations, are considered. Ratifying the proposition of the study, it is considered that, although the alignment between attributes and governance structures can contribute to the protection against opportunistic behavior, as proposed by TCE, this is still not enough to guarantee economic rights on both sides of the transaction, as noted in MCE.

Likewise, through the data presented and based on studies of complementarity between TCE and MCE, it can be induced that such problems are still associated with bilateral dependence between agents. In this case, the producer becomes more dependent on the processor, needing to accept the price given through market analysis, without considering the quality of the milk captured. Therefore, it can be inferred that, as Barzel (2005) proposes, the dairy AGS producers and processors in Paraná resort to ex ante guarantee mechanisms to control ex post costs, arising from the absence of contracts and information during the negotiation.

Finally, even though in the processors' view the high output of small producers from the activity is offset by the increased productivity of larger producers, this may contribute to a scenario of concentration of income and production only in large properties. Such concentration is harmful because it can generate losses for the processor itself, contributing to intensify a situation of dependence on one side of the transaction and not interdependence between agents, opening even more space for opportunistic behavior, higher transaction costs and the emergence of new competitors in the market. This configuration confirms what Jank, Farina and Galan already predicted in 1999, stating that the low performance of a certain segment can compromise the results of the system as a whole, justifying the deepening of this phenomenon observed in the study.

5. CONCLUSION

In this article, the objective was to understand how governance structures and the search for value protection influence transaction costs in the relationship between dairy producers and processors in Paraná. In search for value protection, it was observed that the hybrid governance structure based on informal agreements manages to adapt to environmental uncertainties, yet it is not sufficient to protect the economic rights of agents. Thus, in the absence of a formal

contract that guarantees a minimum standard price to be paid for milk and the availability of information in the transaction, the agents become exposed to higher transaction costs. These costs arise from the agents' effort to protect value, especially producers to negotiate in search for better prices, formalized information and guarantees that the agreed value will be fair for both sides of the transaction.

For this reason, it was considered that if the hybrid structure can be efficient when it is observed only its alignment with transaction attributes through TCE, it can still present inefficiencies and considerations on MCE. Considering measurement and availability of information on the dairy AGS in Paraná, this study demonstrated that although the hybrid structure is able to reduce transaction costs according to the alignment proposed by TCE, measurement costs arise due to agent's efforts in order to protect property rights. It was identified, therefore, that the absence of legal rights can lead to withdrawal of producers from continuing in the transaction with the same processor, or even at the limit to the departure of a significant portion of small producers from the dairy activity.

In summary, as theoretical implications it is observed that transaction costs by TCE and MCE are configured in different ways in this AGS. To TCE, transaction costs justify the hybrid structure due to the alignment with transaction attributes. On the other hand, to MCE it can be inferred that the transaction in the dairy AGS can be costlier, given that the information is necessary to protect the economic rights. Thus, even if the hybrid structure in TCE is adequate due to the alignment with transaction attributes, MCE can explain why even in this structure, agents still need guarantee mechanisms such as long-term relation, normative instructions, informal agreements and legal apparatus in an attempt to protect value, given the information problems.

Moreover, as empirical implications the study showed that the situation of dependency identified between agents, with a greater degree on the producer's side, can influence the transaction costs associated with value appropriation by the processor. Because they do not have formal contracts and because the price of the milk is mostly given only on the basis of market analysis, many producers face difficulties in negotiating. These, in turn, are exemplified as problems to negotiate for better prices, to reinvest in the property and to ensure that they are receiving a fair value according to the quality of the milk offered.

Finally, as limitations of the study, the following stand out: conducting interviews remotely, due to the conditions imposed by the COVID-19 pandemic, which limited the possibility of creating an environment conducive to in-depth interviews and also hindered access to micro and small producers, in addition to the difficulty of accessing medium and large producers from other regions in Paraná. For future studies researches can: a. identify how the measurement process and information transmission can be improved to guarantee value protection to milk producers and processors; b. discuss the use of formal contracts, with forward planning and a standard minimum price; c. discuss the impacts of informality in the dairy AGS.

REFERENCES

ACOSTA, D. A.; SOUZA, J. P.; BÁNKUTI, S. M. S. Tecnificação de Produtores e Estruturas de Governança no Sistema Agroindustrial de Leite. **Desenvolvimento em Questão,** 2018.

BARDIN, L. **Análise de Conteúdo.** Edição Revista e Ampliada. 3 ed. São Paulo, 2011.

BARZEL, Y. Measurement Cost and the Organization of Markets. **Journal of Law and Economics**, v. 25, n. 1, p. 27-48. 1982.

BARZEL, Y. Transaction costs: are they just costs? **Journal of Institutional and Theoretical Economics,** p. 4-16. 1985.

BARZEL, Y. Economic Analysis of Property Rights. **Cambridge University Press,** 1997.

BARZEL, Y. Organizational Forms and Measurement Costs. **Journal of Institutional and Theoretical Economics,** JITE 161, p. 357-373. 2005.

BRASIL, Presidência da República. Diário Oficial da União. **Ministério da Agricultura, Pecuária e Abastecimento (MAPA).** Instrução Normativa Nº 76, de 26 de Novembro de 2018. p. 9-10. Brasília, 2018. Available in: <https://pesquisa.in.gov.br/imprensa/jsp/visualiza/index.jsp?data=30/11/2018&jornal=515&pagina=9&totalArquivos=318>. Accessed in: 28 set. 2020.
BRASIL, Presidência da República. Diário Oficial da União. **Ministério da Agricultura, Pecuária e Abastecimento (MAPA).** Instrução Normativa Nº 77, de 26 de Novembro de 2018. p. 10-11. Brasília, 2018. Available in: <https://pesquisa.in.gov.br/imprensa/jsp/visualiza/index.jsp?data=30/11/2018&jornal=515&pagina=10&totalArquivos=318>. Accessed in: 28 de set. de 2020.
CARVALHO, G. R.; CHAVES, D. O.; ROCHA, D. T. Volatilidade de preços no mercado de leite e das commodities agrícolas. **Anuário do Leite – EMBRAPA.** 2020.
CASALI, M. *et. al.* Information asymmetry among dairy producers in Paraná, Brazil. **Semina: Ciências Agrárias,** v. 41, n. 1, p. 293-304. Londrina, 2020.
COASE, R. H. The nature of the firm. **Economic**. London, v. 5, n. 16. p. 386-405, 1937.
COASE, R. H. The Problem of Social Cost. **The Journal of Law and Economics**, v. 3, p. 1-44. University of Virginia, 1960.
FOSS, K.; FOSS, N. Assets, Attributes, and Ownership. **International Journal of the Economics of Business,** v. 8, n. 1, p. 19-37. 2000.
ITO, N. C.; ZYLBERSZTAJN, D. Power and selection of contract terms: the case from the Brazilian orange juice sector. **R.Adm,** v. 51, n. 1, p. 5-19, São Paulo, 2016.
JANK, M. S.; FARINA, E. M. M. Q.; GALAN, V. B. **O Agribusiness do leite no Brasil.** São Paulo: Pensa/Editora Milkbizz, 1999.
MIRALES, E.; SOUZA, J. P. Estruturas de governança no Sistema Agroindustrial Lácteo do Paraná. **Igepec,** v. 21, n. 2, p. 147-163. Toledo, 2017.
SOUZA, J. P.; BÁNKUTI, S. M. S. Uma Análise dos Contratos no Sistema Agroindustrial Suinícola no Oeste Paranaense Pela Ótica da Mensuração e da Transação. **Informe Gepec**, v. 16, n. 2, p. 79-97. Toledo, 2012.
SOUZA, J. P.; BÁNKUTI, S. M. S. Transactions in coffee and milk agri-food value chains: why measure? In: GAETANO, M. *et. al.* **It's a jungle out there – the strange animals of economic organization in agri-food value chains.** Wageningen Academic Publishers, 2017. p. 139-160.
SUDRÉ, C. A. G. W.; SOUZA, J. P.; BOUROULLEC, M. M. D. Escolha da estrutura de governança: ECT, MCE e PDCA no Sistema Agroindustrial do leite no Paraná, Brasil e na antiga Midi-Pyrénées, França. **Revista Gestão e Planejamento**, Salvador, 2020.
WILLIAMSON, O. E. **The economic institutions of capitalism.** Firms, Markets, Relational Contracting. China Social Sciences Publishing House. 1985.
WILLIAMSON, O. E. Comparative economic organization: the analysis of discrete structural alternatives. **Administrative Science Quarterly,** v. 36, n. 2, p. 269-296. 1991.
WILLIAMSON, O. E. The theory of the firm as governance structure: from choice to contract. **Journal of Economic Perspectives**, v. 16, n. 3, p. 171-195. 2002.
ZYLBERSZTAJN, D. Papel dos contratos na coordenação agroindustrial: um olhar além dos mercados. **SOBER**, Ribeirão Preto, 2005.
ZYLBERSZTAJN, D. Measurement costs and governance: bridging perspectives of Transaction Cost Economics. **Caderno de Administração,** v. 26, n. 1, Maringá, 2018.