

Mechanisms of property rights protection in dairy agro-industrial systems: A study in Paraná, Brazil, and old Midi-Pyrénées, France¹

Mecanismos de proteção de direitos de propriedade no sistema agroindustrial do leite: Um estudo no Paraná, Brasil, e na antiga Midi-Pyrénées, França

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Abstract

Purpose: This study aims to understand the mechanisms of property rights guarantee in the dairy agro-industrial system (DAGS) in Paraná, Brazil, and in the old Midi-Pyrénées region, France.

Originality/value: From a complementary perspective of Transaction Cost Theory and Measurement Cost Theory, the proposal in the study is that the use of mechanisms to guarantee property rights through safeguards, parameters, measurement, agreements, or litigation contributes to the transaction of differentiated products and also to the protection of these rights, favoring systems improvement.

Design/method/approach: A descriptive qualitative study was done, encompassing 25 semi-structured interviews with producers, processors, and key agents of the DAGS in the state of Paraná in Brazil and in the old Midi-Pyrénées region of France, in 2016 and 2017. Qualitative content analysis was performed with NVivo Pro software.

Findings: It was identified that in France and in the central-eastern and western regions of Paraná, the use of complementary protection property rights mechanisms (safeguards, parameters, measurement, agreements, or litigation) allows higher quality milk transactions and reinvestments in production by agents, contributing to system improvement. In the northern region of Paraná, the limited use of property rights mechanisms (verbal agreement, measurement, unreliable information sharing, and the absence of *ex post* protection) allows minimal quality milk transactions and restricts reinvestments in production, limiting systems improvement.

Keywords: property rights, protection mechanisms, dairy agro-industrial system, Transaction Cost Economics, Measurement Cost Economics

Resumo

Objetivo: Compreender os mecanismos de proteção de direitos de propriedade utilizados no sistema agroindustrial (SAG) do leite no Paraná, Brasil, e na antiga região de Midi-Pyrénées, França.

Originalidade/valor: A partir de uma perspectiva complementar da Economia dos Custos de Transação e da Economia dos Custos de Mensuração, a proposição é que o uso de mecanismos de garantia de direitos de propriedade, de forma complementar, por meio de salvaguardas, parâmetros, mensuração, acordos ou litígios, contribui para a transação de produtos diferenciados, a proteção desses direitos e melhorias no sistema.

Design/metodologia/abordagem: Trata-se de pesquisa qualitativa do tipo descritiva contemplando 25 entrevistas semiestruturadas com produtores, processadores e agentes-chave do SAG do leite no Brasil, no estado do Paraná, e na França, na antiga região de Midi-Pyrénées, nos anos de 2016 e 2017. A análise de conteúdo qualitativa foi realizada com o auxílio do *software* Nvivo Pro.

Resultados: Identificou-se que, na França e nas regiões centro-oriental e oeste do Paraná, o uso de mecanismos de proteção de direito de propriedade de maneira complementar (salvaguardas, parâmetros, mensuração, acordos ou litígios) permite a transação de leite com qualidade superior e reinvestimentos na produção por parte dos agentes, contribuindo para melhorias no sistema. Na região norte do Paraná, o uso limitado de mecanismos de proteção dos direitos (acordos verbais, mensuração e compartilhamento de informação não confiável e ausência de proteção *ex post*) permite a transação do leite com qualidade mínima e restringe reinvestimentos na produção, limitando as melhorias no sistema.

Palavras-chave: direito de propriedade, mecanismos de proteção, sistema agroindustrial do leite, Economia dos Custos de Transação, Economia dos Custos de Mensuração

INTRODUCTION

Rural production contributes to the well-being and prosperity of countries. Its importance stands out in certain respects, such as to the economy and the production of food and raw materials and as a source of productivity growth and technological innovation (Organization for Economic Cooperation and Development, 2019). The present study focuses on the dairy agro-industrial system (DAGS), which has worldwide representation for the generation of jobs and for offering relatively quick returns to small-scale producers. Milk provides sustenance for one billion people worldwide, with 881 million tons of cow's milk produced in 2019. In addition, more than 80% of the world's population (approximately six billion people) consume milk and/or dairy products regularly (Fédération Internationale du Lait & International Dairy Federation, 2020).

The study of DAGS transactions is important because these transactions carry asymmetric information about the characteristics of products and processes, opening space for opportunism and strategies for capturing property rights (Zylbersztajn, 2017). In this orientation, protection mechanisms are necessary to guarantee that the investments made will bring the rights to the parties, minimize opportunistic attitudes of income appropriation among agents, and favor efficiency (cost reduction) and development in the chain (greater income generation).

Although the New Institutional Economics (NIE) literature usually deals with protection mechanisms in isolation, such as safeguards (Williamson, 1985, 1996), parameters (Barzel, 1997, 2002), agreements, arbitration, and litigation (Williamson, 1985, 1999, 2000), and measurement (Barzel, 2005) as monitoring mechanisms, the proposal in this study is that agents use these mechanisms in a complementary way to increase the guarantee of property rights and promote improvements in the system. Given that the understanding of these conditions involves mechanisms at different moments of the transaction (*ex ante*, during, and *ex post*), it is proposed to consider the complementarity of Transaction Cost Economics (TCE) and Measurement Cost Economics (MCE).

According to Zylbersztajn (2017), problems faced by agricultural production await answers, and the chain and systems converge at the point where actors need to cooperate to produce value and govern complex mechanisms of production and sale. Thus, economics and agribusiness management studies based on the perspective of property rights have gained strength (Zylbersztajn, 2017). It is observed that both TCE and MCE focus on the search for the guarantee of property rights between transacted parties.

According to Auerbach and Azariadis (2015), guaranteeing property rights favors efficiency through better product choices and more significant capital gains.

In this article, the research object is the DAGS in Brazil, focusing on the state of Paraná, and the DAGS in France, focusing on the old Midi-Pyrénées region. In Brazil, the study was carried out considering its representativeness in production. In 2017, the country was the fourth largest milk producer in the world (Centre National Interprofessionnel de l'Economie Laitière [Cniel], 2019), but it lacks development to improve its productivity. The reference to France is justified by its relevance, as the country is one of the world's main centers in developing dairy technologies and exploring product differentiation strategies. In addition, it accounts for the second-largest European market for UHT milk and, in 2017, was responsible for producing approximately 3.6% of milk worldwide (Cniel, 2019).

The research in two countries with two different systems (in both organizational and institutional terms and operational and competitive capabilities) seeks to identify positive instructions that serve to guide decisions in the search for systems improvement. Furthermore, this diversity can contribute to understanding the dynamics' heterogeneity. According to Zylbersztajn (2017), the diversity of existing coordination mechanisms is common and reveals the need to understand these phenomena.

Some data reveal this diversity, such as production, productivity, consumption, and trade balance. In 2017, Brazil produced 35.7 million tons of cow's milk, had a yield of 1,861 kg/cow/year, and consumed 49.3 kg of liquid milk, 0.4 kg of butter, and 3.8 kg of cheese per inhabitant (Cniel, 2019). In 2018, Brazil had a deficit in the dairy trade balance of US\$413.2 million (Companhia Nacional de Abastecimento, 2018). In France, in 2017, 25 million tons of cow's milk were produced, with a yield of 6,953 kg/cow/year and consumption of 47.4 kg of liquid milk, 8 kg of butter, and 26.4 kg of cheese per inhabitant (Cniel, 2019). In 2018, France had a balance of €3,573 million in dairy and milk-based products in the trade (Cniel, 2019).

It is clear that dairy production in Brazil needs improvement. In the Brazilian DAGS, the following can be identified: the use of animals without aptitude for milk production or with inappropriate genetic potential; inadequate food, productive, and sanitary management; and low level of education of producers. These characteristics make it difficult to use technologies and other technical assistance (Brasil, 2014). Thus, a better understanding of the property rights mechanisms used in the DAGS is sought. It is noteworthy that consumers seek quality foods and beverages that are naturally healthy, bring some benefits, and are naturally functional, which enhances

the consumption of special milk (Siqueira & Arcuri, 2019). Thus, consumers' demand for quality milk requires investments from the rural producer to increase the quality of the raw material (adequate presence of fat and protein and absence of contamination by somatic and bacterial cells). The need for investments requires a counterpart from the processors, who pay for the product's quality delivered through the investments made.

Thus, some questions are highlighted:

- What are the mechanisms that TCE and MCE present to protect the property rights of agents in transactions?
- And, empirically, what protection mechanisms do agents use to guarantee the return on investments made?
- What are the results?

The present study seeks to answer the following question:

- How are the mechanisms for protecting property rights established in the DAGS in Paraná-BR and the former region of Midi-Pyrénées-FR?

For this, it aims to understand the mechanisms of protection of property rights used in the DAGS in Paraná-BR and in the former region of Midi-Pyrénées.

Thus, the present investigation seeks to contribute to studies on property rights by considering protection (*ex ante* and *ex post*) and monitoring mechanisms in a complementary way. Therefore, the proposition is that the use of mechanisms to guarantee property rights contributes to the transaction of differentiated products and the protection of the rights involved, favoring improvements in the system. These improvements emerge by providing reinvestments, better value distribution, and efficiency and reducing transaction, measurement, and negotiation costs.

THEORETICAL REVIEW

Property rights

Because of the NIE, the TCE and the MCE seek to understand the guarantee of property rights, and, in the present study, these approaches are treated in a complementary way. Other studies have already used the complementarities of these theories (Barzel, 2001, 2005; Ito & Zylbersztajn, 2016; Augusto & Souza, 2017; Augusto et al., 2017; Zylbersztajn, 2018; Guimarães & Bánkuti, 2019), considering the objective in common for the

search for efficiency in reducing transaction and monitoring costs. According to Zylbersztajn (2018), both theories share the same bases but differ in key variables, explicit assumptions, and internal logic.

The complementarity in the study is identified when considering, jointly, the mechanisms of incentive to the protection of property rights by the MCE (*ex ante* perspective in the allocation of resources to maximize value) and by the TCE (*ex post* perspective in the quasi-rent protection) (Zylbersztajn, 2018). Thus, the TCE and MCE protection mechanisms are observed in a complementary way in order to maximize the protection of the agents' rights.

The protection of property rights is evidenced by opportunism (Zylbersztajn, 2018). According to Williamson (1985), opportunism is a condition of human nature that seeks self-interest at the expense of others. This can reflect in behaviors such as cheating, lying, stealing, deception, and incomplete or distorted disclosure of information to obfuscate or confuse the other. The assumption is that just the possibility of acting in this way implies efforts to protect against this type of behavior, representing the so-called transaction cost (Williamson, 1985).

According to Coase (1960), property rights should be considered the right to perform certain actions. Barzel (1982, 1994), in turn, adds that the individual's property right over resources consists of the rights, or powers, to consume, obtain income, and dispose of these resources. Thus, the agent who owns the asset has the right to make decisions in situations not covered by the contract (Foss & Foss, 2015).

Barzel (2001) distinguishes legal rights and economic property rights, considering legal rights as "[...] individuals' rights that the state helps enforce" (Barzel, 2001, p. 4), which means the legal recognition of a title over an asset. The economic right is characterized by Barzel (1994) as the ability to consume the services of the asset directly or indirectly through an exchange, that is, the right over the attributes of an asset controlled by an agent. In this sense, Barzel (2005, p. 358) defines property rights as: "[...] economic rights over a good, and they indicate the ability to enjoy the good directly or indirectly through exchange."

It is important to consider that ownership is never complete or absolute (Barzel, 2001; Foss & Foss, 2015). In this sense, the focus should be on the possession of the attributes of the assets, not only of assets, to minimize the imprecision of the property definition (Barzel, 1997). This is because most assets have many attributes, which may or may not be known, and the knowledge of these attributes makes it possible to clarify the property and facilitate the search for its possession. This orientation aims to understand not only how products are transacted but also how their properties and their

respective information can be used to establish exchange relations, and how property can be divided among traders (Barzel, 1982).

It is observed that the better the guarantee of property rights, the more positive consequences result, such as a reduction of opportunistic behavior (Williamson, 1985); more productive choices, increasing efficiency made by agents; and impacts on economic growth and development (Auerbach & Azariadis, 2015).

This is because when property rights are limited, agents are more likely to act opportunistically (Williamson, 1985). According to Auerbach and Azariadis (2015), the greater the fragility of protecting rights, the more people are attracted to unproductive activities, generating lower gains than full capacity. In addition, for the authors, the limitation of property rights affects the expected return on all types of investments and generates misuse of resources. According to Leite et al. (2014), without guaranteeing property rights, betrayal, deceit, and other bad behavior can exist among agents.

It is noteworthy that the institutional environment also influences the guarantee of property rights through formal rules (constitutions and laws) and informal restrictions (sanctions, customs, traditions, and codes of conduct) (North, 2003). These seek to establish order and reduce uncertainty in exchanges, generating incentives and disincentives in economic, political, and social behavior. As this environment ensures private property rights, the possibility of economic growth and development is expanded (Auerbach & Azariadis, 2015).

In the case of DAGS, property rights influence producers' investment decisions. This is because investments are typically incorporated into the land, and the appropriation of the return on this investment depends on the maintenance of the usufruct right of the land, or its alienation, in which the value of the investments may be lost. Thus, the risk of expropriation of land implies the risk of expropriation of the investments incorporated into it (Azevedo, 2000).

Protection mechanisms

Ex ante protection mechanisms

According to Williamson (1985), before the transaction is carried out, agents create safeguards to protect the investments that will be made and minimize the possibilities of value appropriation resulting from *ex post* opportunistic behavior. Safeguards are defined by Williamson (1996) as an additional security resource used in agreements between agents to reduce

risks and generate trust, which may be sanctions or reduced incentives to deal with contingencies.

These safeguards can be 1. incentives for carrying out the transaction, which usually involves fines in the event of premature termination of contracts; 2. a specialized governance structure for dispute resolution; and 3. introduction of commercial regularities that support and signal the continuity of the transaction, such as expanding the transaction from unilateral to bilateral. Transactions that do not have safeguards tend to be contractually unstable if they require specific investments (Williamson, 1996). Thus, these transactions are unprotected and subject to opportunistic behavior.

For Williamson (1996), the definition and use of safeguards depend on the institutional environment that supports the transaction. When the institutional environment provides general safeguards for transactions (through formal rules and informal restrictions), the transaction costs will be lower, as there will be no need for specific safeguards for each transaction.

In addition, the definition of parameters, presented by Barzel (1997, 2002), configures an *ex ante* protection mechanism. According to the author, the parameters standardize the traded products, facilitate the negotiation and control of the dimensions of the traded assets, and reduce measurement costs. This facility occurs because the parameter establishes what is expected of the parties, defines the rights of agents, and reduces the possibilities of product diversity (Barzel, 2002).

Monitoring mechanisms

Another protection mechanism is the measurement of the dimensions of the transacted assets (Barzel, 2005). According to the author, measurement is a particular form of information that can occur in the production process and during the consumption of products. In the execution of production, the contracted measurement tends to be objective and verifiable, while in consumption, it is usually subjective (Barzel, 2005).

According to Barzel (2001), every transaction requires measuring what each party agrees to give to the other. This enables the generation of information that gives the meaning of ownership to agents (Barzel, 2005). In this sense, sharing this information allows different asset specificities levels to be transacted. With knowledge, agents can use mechanisms to guarantee property rights (Barzel, 2005).

It is important to consider that measurement is costly and subject to errors (Barzel, 2005). According to Barzel (1994), as it is difficult to obtain complete information on the dimensions of assets, property rights are never

fully delineated. Furthermore, as it is expensive to measure these dimensions, the potential for capturing income is present in exchanges.

Monitoring can be performed by the transaction participants themselves or by a third party (Barzel, 2001). In the case of DAGS, considering the interdependence between the agents in the chain for the final result in production, the importance of monitoring is accentuated (Ménard, 2000). To ensure quality products and exploit certification seals, monitoring mechanisms are now carried out by a third party (Raynaud et al., 2009).

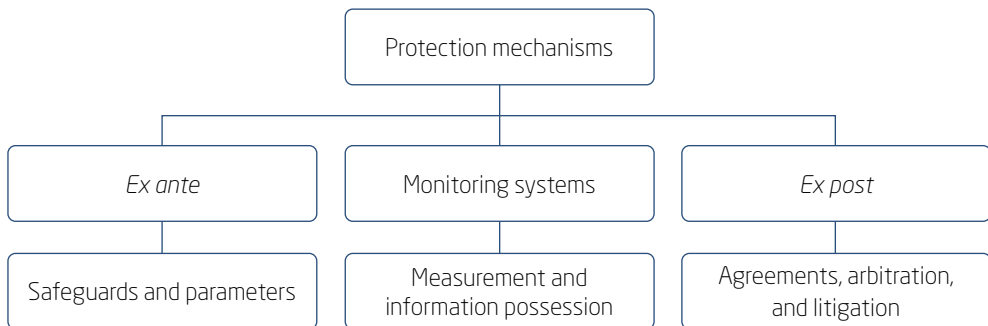
Ex post protection mechanisms

After the transaction is completed, some mechanisms, such as agreements, arbitration, and litigation, can still be used to guarantee property rights (Williamson, 1985, 1999, 2000). Agreements are negotiations to resolve differences to continue the transaction (Williamson, 2000).

Arbitration occurs with a neutral third party’s assistance to resolve disputes without going to court (Williamson, 1985). According to the author, arbitration is intended to provide clarification to promote the continuity of the transaction and represents lower costs for the parties.

Litigation occurs when agents invoke the court to resolve conflicts, usually resulting in the transaction’s closing. In this case, no efforts are made to continue the transaction, characterizing a final appeal due to the high cost. Thus, litigation is used only when agreements or arbitration are not carried out (Williamson, 1999). Figure 1 presents the mechanisms to guarantee the identified property rights, according to the studies by TCE and MCE.

Figure 1
Mechanisms for guaranteeing property rights

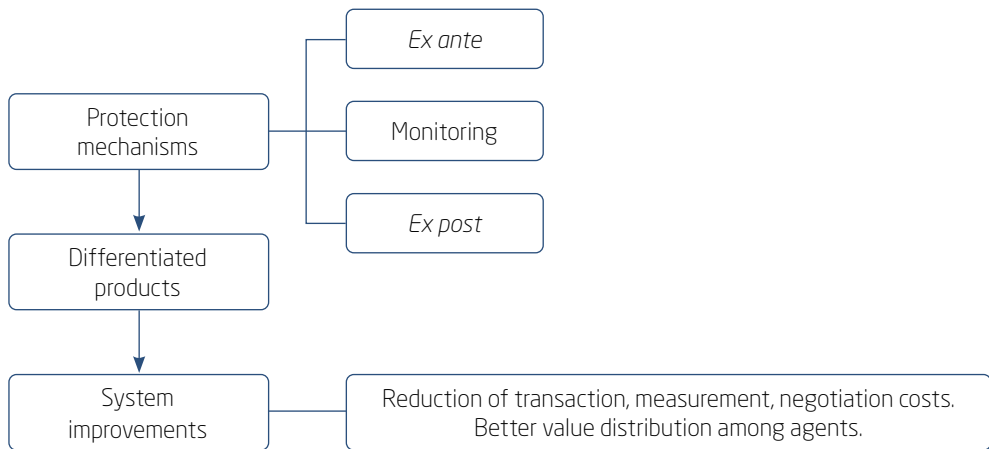


Source: Elaborated by the authors based on Williamson (1985, 1996, 1999, 2000) and Barzel (1994, 2001, 2002, 2005).

Based on these considerations, the present study is supported by the following proposition: the use of mechanisms to guarantee property rights in a complementary way (monitoring, *ex ante*, and *ex post* to the transaction) contributes to the trade of differentiated products and also to the protection of the rights involved, favoring improvements in the system. The products are considered differentiated for meeting the dimensions established by the processors as representative of quality, which can generate a higher price. The improvement of the productive system occurs due to the higher value that the producers receive for the superior quality of the products that are guaranteed *ex ante*. This generates the possibility of reinvestment on the part of the agents, resulting from a better distribution of value and a reduction of transaction, measurement, and negotiation costs. Figure 2 presents the dynamics associated with the mechanisms of rights protection identified in the study proposal.

Figure 2

Dynamics associated with property rights protection mechanisms



Source: Elaborated by the authors.

METHODOLOGICAL PROCEDURES

Following the objectives proposed in the study, the research is of qualitative nature of the descriptive type, with a transversal cut and longitudinal perspective. Qualitative research is justified because the purpose is not to count or measure events but to understand the situations and characteristics of the interviewees in detail (Richardson, 2008). The study was developed through bibliographic research and field research. With primary and secondary

data, the field research was carried out with semi-structured interviews with producers, processors, and key agents in the milk chain in Brazil and France in 2016 and 2017. In total, 25 interviews were carried out in the two countries: in France, eight producers, two processors (one cooperative and one dairy), and two key agents, and in Brazil, ten producers and three processors (two cooperatives and one dairy). Table 1 presents the producers' main characteristics, and Table 2 identifies the characteristics of the interviewed processors.

The selection of respondents was based on availability and convenience, affected by the region surveyed and the respondents' acceptance of participating in the interviews. Thus, in Brazil, data collection occurred in the state of Paraná, in the central-eastern, western, and northern regions, and France, in the old Midi-Pyrénées region, in the southwest of the country. In Paraná, the choice of areas was based on the two most representatives of the state, the Central-East and West, and the North, which is less developed (Instituto Paranaense de Desenvolvimento Econômico e Social, 2009). The choice for these regions was due to the differences in production, seeking to understand the most advanced in terms of productivity, technology, and management and to present a triangulation with the less developed region.

To reach the objectives, the main questions of the interviews were about the definition of the price of the liter of milk and how this value is negotiated, the main formal and informal rules that are followed for production, the guarantee of milk characteristics required by the processor (measurement), the sharing of information between agents and the existence of clarity in this process, the possibilities of reinvestment in production with the income generated, the continuity in production, how the guarantee of legal rights in the relationship occurs, and differentiated product production.

Data processing was carried out through full transcription of the recorded interviews in Portuguese using the NVivo Pro software. The interviews carried out in France were translated by the authors with the help of researchers from the École d'Ingénieurs de Purpan, France, which helped to minimize the loss of information in the translation process. For the analysis and interpretation of data, qualitative content analysis was used, following the phases established by Moraes (1999): preparation of information; unitarization or transformation of content into units; categorization or classification of units into categories; description; interpretation.

According to Merriam (1999), to generate validity and reliability of the research, data triangulation should be performed using several sources of information to confirm the results achieved. In the present study, triangulation took place considering the primary data from the interviews, secondary data, and theoretical review.

Table 1
Characteristics of the interviewed producers

Regions	Productivity (liters/cow/day) in 2016*	Producer	Time in milk production (years)	Number of cows	Average production per animal (liters/day)	Governance structure	Buyer
Midi-Pyrénées, France ¹	15.74	1	35	50	24	Contract and integration	Cooperative
		2	38	110	25	Contract	Cooperative
		3	10	44	25	Tacit contract and integration	Cooperative
		4	21	80	27	Tacit contract	Private company
		5	30	75	30	Contract	Cooperative
		6	17	50	23	Contract	Private company
		7	41	120	23	Contract	Private company
		8	7	70	27	Contract	Private company
North, Paraná ²	4.25	9	5	85	15	Tacit contract	Private company
		10	5	17	20	Agreement and integration	Private company
Central-eastern, Paraná ²	14.87	11	8	40	18	Contract	Cooperative
		12	20	160	21	Contract	Cooperative
		13	5	98	19	Contract	Cooperative
		14	25	140	31	Contract	Cooperative

(continue)

Table 1 (conclusion)
Characteristics of the interviewed producers

Regions	Productivity (liters/cow/day) in 2016*	Producer	Time in milk production (years)	Number of cows	Average production per animal (liters/day)	Governance structure	Buyer
West, Paraná ²	10.34	15	17	180	22	Contract	Cooperative
		16	25	40	20	Contract	Cooperative
		17	10	39	24	Contract	Cooperative
		18	40	70	20	Tacit contract	Cooperative
		19	30	46	22	Tacit contract	Cooperative

Source: Elaborated by the authors based on Secretaria de Estado da Agricultura e do Abastecimento e Departamento de Economia Rural – Seab/Deral (2017), Cniel (2018), Instituto Brasileiro de Geografia e Estatística – IBGE (2021), and primary data.

Note: * Productivity was calculated by dividing production in liters in 2016 by the number of cows milked in the same year and divided by 365.¹ Production and milked cows in 2016 (Cniel, 2018).² Production in 2016 (Seab/Deral, 2017) and milk cows (IBGE, 2021).

Table 2*Characteristics of the processors interviewed*

Country	Processor	Founding year	Number of supplier producers	Type of company
France	1	1964	2,300	Cooperative
	2	1919	400	Private company
	3	1991	130	Private company
Brasil	4	1951	369	Cooperative
	5	1977	1,000	Cooperative

Source: Elaborated by the authors based on primary data.

RESULTS AND ANALYSIS

Protection mechanisms in Paraná

Considering the importance that the institutional environment has in protecting the property rights of agents (North, 2003), in Brazil, when data were collected, the formal rule was Normative Instruction (NI) no. 62, which defined specific procedures for the control of milk quality, its composition, and the physical, chemical and microbiological requirements for each type of milk, along with methods of analysis (Ministério de Agricultura, Pecuária e Abastecimento [Mapa], 2011)². Thus, NI62 established the parameters for milk collection and monitoring mechanisms for milk characteristics control, which are standard plate count (SPC), somatic cell count (SCC), investigation of antibiotic residues, determination of the cryoscopic index, total solids and non-fat content, relative density, titratable acidity, and fat content, and temperature measurement of refrigerated raw milk. Each analysis has its frequency established by the regulations and the standards to be achieved according to each type of milk.

To monitor the established characteristics, NI62 determined that the analyses should be carried out exclusively in an operational unit of the Brazilian Network of Milk Quality Control Laboratories (BMMQ), a third-party laboratory accredited to monitor the quality of the product. It is noted

² Later, in 2018, NI62 was replaced by NIs 76, 77, and 78, which regulate the production, transport, and milk processing, aiming to increase its quality (Mapa, 2018)

that monitoring by a third party favors the guarantee of property rights, as Raynaud et al. (2009) considered. Thus, in Paraná, in all regions surveyed, all respondents fulfilled the parameters established by the NI62. The measurement of milk dimensions occurs in accredited laboratories and the processors' laboratories (cooperative or industry).

In the central-eastern and western regions, where formal contracts are used in the relationship between producer and processor, the *ex ante* protection mechanisms identified are the safeguards and parameters established in the contract, which are also presented as legal rights of the transaction when considering Barzel's (2001) proposition. This document stipulates the producer's loyalty conditions with the cooperatives, the herd health issues, and the milk pricing rules. With this, the uncertainties in the relationship are reduced, as well as the possibilities of opportunistic behavior and the search for value appropriation, given that the final price varies according to the dimensions of the milk traded.

Measurement in a certified laboratory is used to generate information on the contracted dimensions to monitor the transaction based on the guidelines of Barzel (2001). It is identified that, as stated by Barzel (1982, 1994), measurement allows transaction and guarantee not only of the asset milk but of its dimensions that are established in the contract and evaluated in collections. The information is shared and controlled by the producers and the cooperative, which makes it possible to increase the guarantee of property rights to agents (Barzel, 2005). These parameters make sure that the measurement is precise and objective and performed with laboratory equipment, as explained by processor 04:

To evaluate the content of fat, protein, somatic cells, and bacterial count, which are items that enter the chart, we collect a sample per week and send this sample to the laboratory of the Paraná Association of Holstein cattle breeders at Curitiba. It is a laboratory of the network of the Ministry of milk analysis. Then we consider the analysis results to verify the parameters of the chart. [...] At the same time that the laboratory results come to me, they go to the producer. From the laboratory, it goes to the cooperative, and the cooperative sends this by SMS to all the producers. In addition, they can also have access through a website.

It is important to note that the result of the analysis influences product pricing and encourages quality milk production, as observed by producer 15:

Measurement is important to maintain quality. From the moment I don't have a differentiated measurement and a differentiated payment, I enter a mass grave, and then people stop making efforts to have quality.

The possibility of making a retest in the analysis generates confidence in the process, as producer 12 reports: "Measurement helps to generate confidence; it is important. If you have any suspicion, you can have a counter-proof too. They store the sample, and if we have any doubts, they analyze it again."

It is observed that the economic right, originating from informal agreements, can be identified in the definition of the milk base price, which is made by the processor and is not guaranteed by the contract. It is noted that the economic right is not fully protected, as revealed by producer 12: "With the cooperative, uncertainty is the price, which varies according to the market." Thus, it is clear that despite the use of complementary protection mechanisms, in transactions, rights are not entirely guaranteed, as Barzel (2001) and Foss and Foss (2015) consider, with the possibility of opportunistic behavior in the definition of the base milk price by the processor.

Legal mechanisms can be used as *ex post* protection mechanisms, which are the two mechanisms (agreement or litigation) identified by Williamson (1985, 1999). Processor 04 cites the possibility of resorting to a court order:

Here, what causes the most conflict and generates emotional distress is getting a judicial communication, having to go to the hearing in the small claims court because of antibiotics. Sometimes the producer does not admit, in any way, that he sent milk with antibiotics.

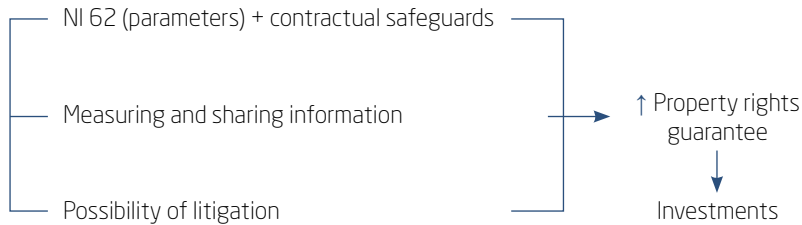
It is observed that, in this case, the contract guarantees the cooperative's right to reject antibiotic milk, which makes its use in the industry for the manufacture of derivatives unfeasible.

Thus, it is observed that using complementary mechanisms to guarantee property rights encourages investments in production, as observed by Auerbach and Azariadis (2015). Producer 11's response summarizes the interviewees' position: "Since we started, we've managed to improve our structure. The issue of property management depends a lot on each producer. But in general, it is possible to invest." Producer 12 reaffirms: "The relationship with the cooperative influences my decisions mainly on what we get in terms of remuneration [...]. The relationship is a little stronger, more reliable."

Figure 3 summarizes the mechanisms for guaranteeing property rights in the cases of formal contracts observed, notably in the central-eastern and northern regions of Paraná.

Figure 3

Mechanisms for guaranteeing property rights and their consequences in formal contracts cases



Source: Elaborated by the authors based on primary data.

The empirical data allow us to identify the convergence with the proposition of the present study. It is observed that the use of *ex ante* and *ex post* protection mechanisms and monitoring systems enables transactions with different levels of asset specificity and measurable dimensions, increases the guarantee of property rights between the parties, and improves the system in making investments in production by agents (producers and processors).

In the northern region of Paraná, where verbal agreement is used most often in the relationship between producers and processors, there was a weakness in guaranteeing property rights. This occurs because the informal contract guarantees only minimum aspects for the price definition. According to other attributes, the additions to the base price are not remunerated or transferred to the producers. The value stipulated by Conseeleite defines milk prices in the region³. In some cases, there are additions, such as quality, distance from the processor, and volume. Thus, *ex ante* transaction protection mechanisms are parameters and safeguards agreed upon orally, which limits the guarantee of rights, as observed in the comment of producer 09:

With company X, where we worked, from one day to the next, they said: “We are going to pay 99 cents a liter, do you want it? If not, it’s your problem [...]”. At the time, there was a huge price drop. Our working capital ended.

³ Consulate-Paraná is an association of representatives of milk producers and dairy industries in the state.

In this case, the legal right is identified in the milk base price established by Conseleite. It is observed, however, that the informal agreement cannot guarantee the legal right, as in the case of producer 09 in the relationship with company X, which obtained a milk price below the value stipulated by Conseleite. The economic right is visualized in the additions that may occur but are also not guaranteed.

In addition, monitoring based on measurement does not generate increases in the milk price according to its quality and generates discounts in cases of non-compliance, according to producer 09:

Once a month, the dairy sends the report with the evaluation information of milk characteristics. But this does not influence the negotiation, even with positive results. It negatively influences if there was an antibiotic, or if it presents the other bad characteristics.

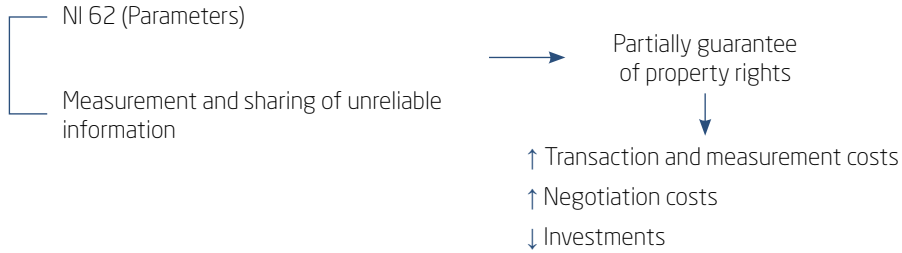
Besides that, the non-guarantee of rights is also manifested by the distrust regarding the measurement results, as reported by producer 09: “In today’s evaluation, we trust when everything is well. When there is a problem, we suspect and do the retest. But this process does not help to generate trust; we are always suspicious.”

In this context, producers have additional costs when performing the retest in a private laboratory in the search for guaranteeing their rights, as well as negotiation costs in an attempt by producers to obtain better prices.

Therefore, it is noted that producers have difficulties investing in production, as considered by producer 09:

They punish us with the price. This is based on the experience we have with them. [...] lack of appreciation of our milk quality, pay us a differential for that. We believe that if they paid a differential for those who have good production, a good analysis, it would be an incentive for those who produce to improve.

Failure to be paid for higher milk quality makes producers produce the minimum quality required by processors in the region, which NI62 establishes. Figure 4 presents the mechanisms for guaranteeing rights and their consequences in the northern region of Paraná.

Figure 4**Mechanisms for guaranteeing property rights and their consequences in verbal agreements cases**

Source: Elaborated by the authors based on primary data.

Thus, weaknesses in property rights guarantees are revealed with the absence of safeguards, unreliable information sharing, and the absence of *ex post* protection, such as agreements, litigation, or arbitration for producers who use verbal agreements. In other words, the mechanisms used are not sufficient to guarantee rights and generate improvements in the system. Observing these elements confirms the failures in ensuring the property rights of the agents and the identified management costs. In addition, the difficulty of investing in production was also observed, due to failures in protecting property rights, as pointed out by Auerbach and Azariadis (2015).

Therefore, based on the theoretical studies and empirical evidence identified in other regions, some suggestions can be made in the search for improvements in the milk production system in the northern part of Paraná. One is the use of safeguards signed in formal contracts, which, according to Williamson (1999), increases trust in the relationship, which needs to be improved in transactions, as identified in the interviews. In addition, the definition of the parameters, also established in formal contracts, can encourage producers to produce quality milk insofar as there is a differentiated form of payment, as empirically identified in other regions. Another mechanism would be the possibility of *ex post* agreements or arbitration (Williamson, 1985), which can also stimulate trust in the relationship since these mechanisms seek continuity in the transaction.

Protection mechanism in France

In France, the influence of the institutional environment on the protection of property rights (North, 2003) can be perceived. There, starting in

2015, the government has regulated the industry by requiring a formal contract with a minimum duration of five years between producers and processors. Thus, it was identified that the *ex ante* protection mechanisms for the transaction are the safeguards and parameters established in the contract, as stated by producer 01:

In the contract, certain conditions are established: how to take the samples, the criteria for payment of the evaluations, the conditions and minimum frequencies of the analyses, the methods of analysis, the devices that can be used for the evaluations, the calculation of the results according to the analyses, and the destination of the samples (authors' translation).

It is noted that under these conditions, the contract reduces uncertainties regarding the agents' future behavior and opportunistic behavior that could occur from the sample collection in the form of payment for the measurement and the performance of calculations regarding the additions. Furthermore, the conditions established in the contract are presented as the legal rights of the transaction (Barzel, 2001).

Monitoring is done by measuring, in all collections, the samples evaluated by the interprofessional laboratory. This laboratory features a third party, which favors the guarantee of rights (Raynaud et al., 2009), and three random samples are considered to define the price premiums. Dimensions measured are volume; levels of fat/butyric matter, protein, bacteria, cells, germs, and antibiotics; and the freezing point. It is noted that, in this way, the property right does not relapse on the milk product but on the product's dimensions, and its awareness by the agents favors the protection of the right, as Barzel (1994) states. This dynamic allows the measurement to be impartial, transparent, and objective and done by laboratory equipment, as producer 01 comments: "It is a machine that does the measurement. The information is sent to the buyer and us" (authors' translation).

As an *ex post* transaction protection mechanism, the monitoring process helps avoid litigation situations, although they can happen (Williamson, 1985, 1999). The processors interviewed stated that, before closing the transaction in court, there is the possibility of agreements, as observed in the speech of processor 02:

The relationship is terminated based on legal process; it has a contractual dimension. Before finalizing, there is a "human" relationship in an attempt to make the necessary adjustments. But when the risks

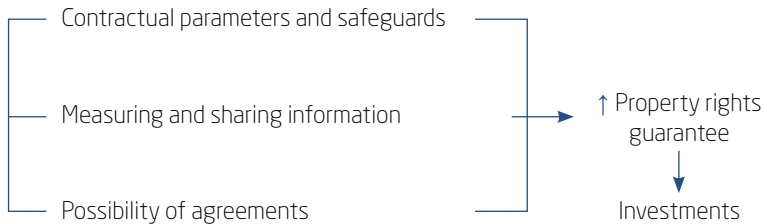
are permanent and visible to the collector who is on the farm frequently, and the producer does not make the adjustments, we legally end this commercial relationship. But stopping the relationship overnight, without justification, doesn't happen (authors' translation).

Protecting property rights encourages investments in producing quality milk; as producer 02 says: "The contract guarantees the return on investments to obtain quality milk [...] We always manage to invest a little."

It is noted that the economic right is empirically identified in the definition of the milk base price, which is not guaranteed by the contract, is defined by the processor, and fluctuates according to market conditions. This right is not fully protected, as identified in producer 01's remark: "The buyer can take advantage of us because they set the base price. So when the product is not good on the market, they lower the price. It's easy for them to work that way" (authors' translation). Thus, it is observed that, despite all protection mechanisms in transactions, rights are still not fully protected, as stated by Barzel (2001) and Foss and Foss (2015). This allows opportunistic behavior to happen. Figure 5 presents the mechanisms for guaranteeing property rights in the Midi-Pyrénées and their consequences identified in the study.

Figure 5

Mechanisms for guaranteeing property rights in the Midi-Pyrénées



Source: Elaborated by the authors from primary data.

Empirical data suggest convergence with the study's proposition. *Ex ante* and *ex post* protection mechanisms and monitoring systems allow transactions with different levels of asset specificity, guaranteeing property rights between the parties. As a result, a reduction in governance costs can be observed, notably by reducing opportunistic behavior in the transaction and the possibility of appropriation of income referring to the price additions. These low measurement costs are divided between the agents and low

incidences of negotiation between the interviewees. In addition, the agents make an investment, which corroborates what Auerbach and Azariadis (2015) claim.

Protection mechanisms: Comparative between Paraná and the old Midi-Pyrénées

In the observance of protection rights mechanisms in France and Brazil, it is noticed that in the regions where the mechanisms are used in a complementary way (*ex ante*, *ex post*, and monitoring) (old Midi-Pyrénées, central-eastern and western Paraná), the results indicated by the basic proposal were identified and confirmed. In the northern region of Paraná, on the other hand, the use of protection mechanisms in isolation makes it possible to guarantee rights partially; increase transaction, measurement, and negotiation costs; and reduce investments, also confirming the proposition of the study. The protection mechanisms used in the researched regions are presented in Table 3.

Table 3
Protection rights mechanisms in old Midi-Pyrénées and Paraná regions

Region	<i>Ex ante</i> protection	Monitoring systems	<i>Ex post</i> protection
France	Safeguards and established contract parameters (dimensions, valuation forms, and additional price variations).	Measurement of samples collected by a third-party laboratory.	Possibility of agreements based on the fulfillment of action plans and litigation.
East-central and West	Safeguards and parameters established in the contracts (fidelity conditions, herd health, milk pricing rules).	Measurement of samples collected by a third-party laboratory.	Possibility of judicial arbitration.
Paraná			
North	Verbally agreed to parameters and safeguards (NI62).	Measurement of samples by third-party laboratories (not trusted by producers).	Not identified.

Source: Elaborated by the authors based on primary data.

CONCLUSION

The objective of the present study was to understand how the guarantee of property rights is presented in the DAGS in Brazil, in the state of

Paraná, and in France, in the old Midi-Pyrénées region. The study on the guarantee of property rights is consolidated, as it allows for a better distribution of value among agents, contributing to improving the systems. Thus, the theoretical-empirical research of a descriptive qualitative nature, and with primary and secondary data, showed convergence to the propositions of this study. This alignment was confirmed by the observation that using complementary mechanisms to protect property rights (*ex ante*, *ex post*, and monitoring) enables the transaction of differentiated products and generates improvements in the systems. This allowed the agents to invest in production, which was identified in the central-eastern and western regions of Paraná, Brazil, and in the old Midi-Pyrénées region of France.

In the northern region of Paraná, the weakness in guaranteeing property rights also ratifies the study's proposition, as the unfavorable consequences for the system were empirically identified. The lack of confidence in the information generated and the lack of payment for higher quality milk do not encourage investments by producers and increase transaction, measurement, and negotiation costs. Thus, milk production with minimum quality does not allow for more significant capital gains in the region or stimulate investment.

In this way, the present study sought to better understand the guarantee of property rights reflecting on the value distribution between agents in a chain. Limitations of the present study are highlighted, such as the difference in times when data were collected. In France, 2016 had a context of low milk prices, while in Brazil, in 2017, the milk price rose. This context may have influenced some of the answers in the interviews, mainly concerning the investment possibilities on the part of the producers. This limitation indicates future studies that deal with longitudinal research, which monitors price fluctuations and investment in properties.

REFERENCES

- Auerbach, J. U., & Azariadis, C. (2015). Property rights, governance, and economic development. *Review of Development Economics*, 19(2), 210–220. <https://doi.org/10.1111/rode.12138>
- Augusto, C. A., & Souza, J. P. D. (2017). Governance structures: A complementary study of transaction costs, measurement costs and strategic resources. *Gestão da Produção, Operações e Sistemas*, 12(4), 204–225. <https://doi.org/10.15675/gepros.v12i4.1788>

- Augusto, C. A., Souza, J. P. D., & Cário, S. A. F. (2017). Strategic contractual relationships in the automotive sector. *Revista de Administração*, 52(4), 443–455. <https://doi.org/10.1016/j.rausp.2017.08.006>
- Azevedo, P. F. (2000). Nova economia institucional: Referencial geral e aplicações para a agricultura. *Agricultura em São Paulo*, 47(1), 33–52.
- Barzel, Y. (1982). Measurement cost and the organization of the markets. *Journal of Law and Economics*, 25(1), 27–48.
- Barzel, Y. (1994). The capture of wealth by monopolists and the protection of property rights. *International Review of Law and Economics*, 14(4), 393–409. [https://doi.org/10.1016/0144-8188\(94\)90023-X](https://doi.org/10.1016/0144-8188(94)90023-X)
- Barzel, Y. (1997). *Economic analysis of property rights*. Cambridge University Press.
- Barzel, Y. (2001). *A theory of organizations: To supersede the theory of the firm* (Working Paper).
- Barzel, Y. (2002). *A theory of state: Economic rights, legal rights, and the scope of the State*. Cambridge University Press.
- Barzel, Y. (2005). Organizational forms and measurement costs. *Journal of Institutional and Theoretical Economics*, 161(3), 357–373.
- Brasil (2014). *Plano Mais Pecuária*. Ministério da Agricultura, Pecuária e Abastecimento.
- Centre National Interprofessionnel de l'Economie Laitière (2018). *L'économie laitière en chiffres: Édition 2018*.
- Centre National Interprofessionnel de l'Economie Laitière (2019). *L'économie laitière en chiffres: Édition 2019*.
- Coase, R. H. (1960). The problem of social cost. *Journal of Law and Economics*, 3, 1–44.
- Companhia Nacional de Abastecimento (2018). *Análise mensal: Leite e derivados: Dezembro de 2018*.
- Fédération Internationale du Lait, & International Dairy Federation (2020). *The global impact of dairy*.
- Foss, K., & Foss, N. J. (2015). Coasian and modern property rights economics. *Journal of Institutional Economics*, 11(2), 391–411. <https://doi.org/10.1017/S1744137414000484>
- Guimarães, A. F., & Bánkuti, S. M. S. (2019). Coordenação em sistemas agroalimentares diferenciados do café: Uma revisão à luz da ECT e da ECM. *Desafio Online*, 7(1), 179–202.

- Instituto Brasileiro de Geografia e Estatística (2021). *Sidra: Sistema IBGE de Recuperação Automática*.
- Instituto Paranaense de Desenvolvimento Econômico e Social (2009). *Caracterização socioeconômica da atividade leiteira no Paraná*. Instituto Paranaense de Desenvolvimento Econômico e Social.
- Ito, N. C., & Zylbersztajn, D. (2016). Power and selection of contracts terms: The case from the Brazilian orange juice sector. *Revista de Administração*, 51(1), 5–19. <https://doi.org/10.5700/rausp1220>
- Leite, D. N., Silva, S. T., & Afonso, O. (2014). Institutions, economics and the development quest. *Journal of Economic Surveys*, 28(3), 491–515. <https://doi.org/10.1111/joes.12038>
- Ménard, C. (2000). Une nouvelle approche de l'agro-alimentaire: L'économie néo-institutionnelle. In I. Boussard, F. Clerc, & J.-C. Kroll, *Économie rurale: Les cinquante premières années de la SFER: Quel avenir pour l'économie rurale?* (pp. 186–196). SFER. <https://doi.org/10.3406/ecoru.2000.5170>
- Merriam, S. B. (1999). *Qualitative research and case study applications in education*. Jossey-Bass.
- Ministério de Agricultura, Pecuária e Abastecimento (2011). *Instrução Normativa nº 62, de 29 de dezembro de 2011*.
- Ministério de Agricultura, Pecuária e Abastecimento (2018). *Instrução Normativa nº 78, de 30 de novembro de 2018*.
- Moraes, R. (1999). Análise de conteúdo. *Revista Educação*, 22 (37), 7–32.
- North, D. C. (2003). *The role of institutions in economic development* [Discussion Papers Series No. 2003.2]. United Nations Economic Commission for Europe.
- Organization for Economic Co-operation and Development (2019). *Rural 3.0: People centred rural policy-policy highlights*. Organization for Economic Co-operation and Development.
- Raynaud, E., Sauvée, L., & Valceschini, E. (2009). Aligning branding strategies and governance of vertical transactions in agri-food chains. *Industrial and Corporate Change*, 18(5), 835–868. <https://doi.org/10.1093/icc/dtp026>
- Richardson, R. J. (2008). *Pesquisa social: Métodos e técnicas* (3a ed.). Atlas.
- Secretaria de Estado da Agricultura e do Abastecimento, & Departamento de Economia Rural (2017). *Bovinocultura de leite*.
- Siqueira, K. B., & Arcuri, P. B. (2019). Leites especiais: Oportunidades de mercado. In N. Rentero, *Anuário do leite 2019: Sua excelência, o consumidor* (pp. 76–77). Embrapa.

- Williamson, O. E. (1985). *The economic institutions of capitalism: Firms, markets, relational contracting*. New York Press.
- Williamson, O. E. (1996). *The mechanisms of governance*. Oxford University Press.
- Williamson, O. E. (1999). Strategy research: Governance and competence perspectives. *Strategic Management Journal*, 20(12), 1087–1108. [https://doi.org/10.1002/\(SICI\)1097-0266\(199912\)20:12%3C1087::AID-SMJ71%3E3.0.CO;2-Z](https://doi.org/10.1002/(SICI)1097-0266(199912)20:12%3C1087::AID-SMJ71%3E3.0.CO;2-Z)
- Williamson, O. E. (2000). The New Institutional Economics: Taking stock, looking ahead. *Journal of Economic Literature*, 38(3), 595–613.
- Zylbersztajn, D. (2017). Agribusiness analysis: Origin, evolution and research perspectives. *Revista de Administração*, 52(1), 114–117. <https://doi.org/10.1016/j.rausp.2016.10.004>
- Zylbersztajn, D. (2018). Measurement cost and governance: Bridging perspectives of transaction cost economics. *Caderno de Administração*, 26(1), 1–19.

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