

Analysis of the Dairy Farm Associative Contract in Argentina: An Approach from the Agent-Principal model

Abstract: The objective of this study was to analyze the Associative Contract for Dairy Farms in Argentina (Law 25.169) using the Principal-Agent model. The relationship between the Owner-Entrepreneur and the Associate-Tambero is analyzed to interpret who is the agent and principal, what are their activities and the incentive mechanisms. It is concluded that the percentage participation that the agent receives from the income is his main incentive from the principal, as well as the availability of good quality housing, internet access and infrastructure. The importance of monitoring and designing contracts to achieve the principal's objective function is highlighted. Another contribution is the visibility of agency costs, which prevent the company from reaching its productive potential, as well as the differences between the size of the farms.

Keywords: Theory of agency, Dairy sector, Contract Theory

INTRODUCTION

Of the world regions of cow's milk, by 2020, South America contributed 9.3% of the total production (Observatorio de la Cadena Láctea [OCLA], 2020), with Argentina being one of the main producers in the region, preceded by Brazil (United States Department of Agriculture [USDA], 2020, 2020). In addition, Argentina is one of the main milk exporters in the world after the European Union, the United States, and New Zealand (USDA, 2020).

The sector has maintained production levels, with a production growth of only 10% in the period 1998-2018 (Galletto, 2018; Lazzarini et al., 2019), together with a decrease in productive units (tambos) mainly of a family type (Federación Panamericana de Lechería [FEPALE], 2012). The maintenance of production levels, achieved even with the closure of production units, can be explained by the use of economies of scale, the increase in average efficiency per milk, per cow (Baudracco et al., 2014; Sanchez et al., 2012) and the average size of dairy farms (Ministerio de Agricultura, Ganadería y Pesca, [MAGyP], 2021). In addition, there is an intensification of resources (number of cows, feed, machinery, inputs and human resources) per unit of area (Baudracco et al., 2014), with an increase in complexity and production costs, without guaranteeing the expected results (Baudracco et al., 2016).

All this, added to the adoption of technologies (Vértiz, 2018), favored the division and specialization of tasks in larger dairy farms (Cominiello, 2011), with an increase in non-family workers to the detriment of family members for milking and operational tasks, while owners and family members take care of management tasks (FEPALE, 2012; Gastaldi et al., 2020). In this context, it is highlighted that dairy production is characterized by a high demand for employment (Castignani et al., 2011; Vértiz, 2018), and that the human factor has the

responsibility of controlling the quality of the process, impacting competitiveness (Catignani et al., 2005). Regarding the contractual forms evidenced, there are both informal contracts, generally in family labor relations, and formal contracts in non-family relations, being legislated mainly by Law N° 25.169, Dairy Farm Associative Contract.

The productive, economic and social transformations that the primary dairy sector is going through in Argentina have generated changes in the organization of work, with an increase in the delegation of tasks to hired labor. In this sense, the Agency Theory offers a theoretical framework to explain, in part, the current situation that the sector is going through. According to Jensen and Meckling (1976), an agency relationship is understood as "a contract under which one or more people (he (the) principal (s)) hire another person (the agent) to perform some service in their name, which implies delegating certain decision-making authority to the agent" (p. 308). By assuming that both parties are utility maximizers, a conflict of interest is generated, the definition of incentives and guarantees to avoid damages by the principal of the agent, as well as the monitoring, can limit the existing differences (Jensen & Meckling, 1995).

For this work, or contribution to this theory that the principal is incapable of verifying the action of the agent, therefore, it requires two incentive mechanisms based on the results of the agent and established in a contract so that, or effort on the part of the agent It is conditioned to its usefulness. Also, from the problem of separation of ownership-control and conflict of interest between the parties, the importance of monitoring and two agency custodians stands out, which prevents the company from reaching its productive potential.

The present study, in addition to this introduction, presents the research problem, a theoretical review, the methodology, the main results and ends with the conclusions of the study.

RESEARCH PROBLEM AND OBJECTIVES

In the productive year 2018-2019, according to the National Institute of Agricultural Technology (INTA) of Argentina, the average area of a farm was 181 ha, with an average of 177 total cows (VT) and a production of 18,5 l/day per cow milking (VO) (Gastaldi et al., 2020). One characteristic of dairy production is the high demand for jobs (Castignani et al., 2011; Vértiz, 2018) and generational rotation, with the need for jobs with "working hours, vacations, days off and the incorporation of automation", in addition to economic viability (Lazzarini et al., 2019, p. 431) which is not always the case in practice.

According to INTA, an average farm employs 5,1 people (4,5 EH, EH = 2.400 annual hours of work), where "58,6% of the work was contributed by hired personnel and the remaining 41,4% by owners and direct relatives (wife, children, grandchildren), with an average proportion 71% of owners and 29% of family members of the owners" (Gastaldi et al., 2020, p. 15). In addition, according to (Castignani et al., 2010), milk production and administrative practices are higher where non-family work predominates.

Regarding the type of tasks to be carried out, the literature shows a growing division and specialization with the increase in the size of the farms (Cominiello, 2011) and the adoption of technologies (Vértiz, 2018). In large dairy farms, the owner delegates tasks related to the milking process (FEPALE, 2012), production management and the agricultural cycle (Vértiz, 2018). The type of task varies according to the origin of the work (owner or family member, or non-family member), gender and size of the company. In fact, the milking tasks occupied 34% of the time, they were carried out by the owners in 12,6% of the cases; this value increases to 43% in the smallest dairy farms (average 65 VT) (Gastaldi et al., 2020).

It should be clarified that the hiring of non-family personnel is usually carried out in two ways: as a percentage (generally between 8% and 20% of production) or by dependency (Cominiello, 2011). In cases where the owner is not the one who performs the milking, the 3 main form of contracting is a partnership regime, the Dairy Farm Associative Contract

established by National Law N° 25.169 since 1999.

In (Wilde, 2001), it is specified that this contract is not present in other foreign legislation, and is of an associative type, which is why the labor dependency of the employer-employee type is not established. The parties participate in the production and take risks with a common objective, which is the production of liquid milk, its sale or distribution (Article 4). Sandoval et al. (2017), interprets the contract and questions the autonomy of the employee, as well as evidences a strong doctrinal and jurisprudential debate on the legal nature of the relationship, since it leads to being legally interpreted as a special type of agricultural work by contract or as an associative relationship, with different implications.

For its part, in Vértiz (2018), it is postulated that the contract favors control by the owner and the diversification of risks in the face of a drop in income or production, both due to internal causes (problems with the herd and production), and external (climatic adversities, lower milk prices, crisis in the sector, etc.). Given the detailed situation and the few studies on the contractual forms used in the sector based on economic theory, as well as the rules of internal organization of farms, the initiative arises to develop this work, which aims to carry out an analysis of the Dairy Farm Associative Contract for the Agent-Principal model.

This study is justified by the importance of filling the gap in the literature on studies that apply the Agency Theory and specifically the Agent-Principal model within the existing contractual relationships in the dairy sector in Argentina. The objective of this study is to propose an analysis for the specific case of the Law 25.169 using the Agent-Principal model.

THEORETICAL APPROACH

This section briefly describes the origin and main concepts of Agency Theory from seminal articles and authors dealing with microeconomics.

Jensen and Meckling (1976), argued that, up to the date of publication of their work, the extensive approach of the economic literature on the Theory of the Firm, based on the contributions of Coase (1937), did not form a theory of the firm in itself, but in a theory of markets, where firms were important players. In their studies, Jensen and Meckling preserved the notion of maximizing the behavior of all individuals and deepened the discussion on the separation between ownership and control, until they reached a definition of agency (Tarzijan, 2003).

In this sense, the agency relationship is defined as "a contract under which one or more people (the principal) hires another person (the agent) to perform a service on their behalf, which implies delegating some authority to take decisions "(Jensen & Meckling, 1976, p. 308).

Jensen and Meckling (1976), point out that "if both parties to the relationship maximize utility, there are good reasons to believe that the agent will not always act in the principal's interest" (p. 308), such as desires and goals between the principal and the agent are in conflict. Therefore, in situations in which one individual hire another to work for him, information asymmetries arise (Mas-Colell et al., 1995).

Information asymmetry can exist before and after the contract is signed, being known as adverse selection and moral hazardⁱ, respectively. In turn, post-contractual information problems can arise from hidden information or hidden actions (Mas-Colell et al., 1995). There is moral hazard whenever the objectives of the parties are different (Salanié, 2005), specifically, the Agent-Principal model is identified with moral hazard (Mas-Colell et al., 1995; Salanié, 2005). The principal does not have the ability to directly observe the action of the agent (Varian, 1992), for his part, he may know more about the task to be performed (Pratt & Zeckhauser, 1986), or perform an action that affects its usefulness and effectiveness of the principal (Salanié, 2005).

Salanié (2005), adds that, due to the asymmetry of information, that is, the impossibility of verifying the effort in action on the part of the agent, the principal cannot

force him to choose an optimal level of Pareto effortⁱⁱ. The principal can only “influence the choice of the agent of action by conditioning the utility of the agent on the only observable variable, that is, the result. This, in turn, can only be done by giving the agent a transfer that depends on the outcome”(p.119), which in turn is determined by the agent's actions.

According to Salanié (2005), the Agent-Principal model is a simplified device for the study of negotiation with asymmetric information, in fact in the model “the optimal Pareto set (restricted) can always be obtained by maximizing the utility of an agent while the other remains at a certain level of utility (Salanié, 2005, p. 6). It is Pareto restricted, in the sense of what level of effort is intended to be maximized in terms of utility.

To mitigate welfare losses in the face of these informational imperfections, the parties seek to develop contracts that reduce the difficulties that cause information asymmetry (Mas-Colell et al., 1995). The contract can be formal or informal and is understood as a promise between the two parties in which their obligations are specified for different situations, with the objective that the agent takes actions that positively influence the welfare of the principal, based on clauses verifiable by the principal and by an external member who verifies the contract.

Due to the difficulty of anticipating all possible situations, contracts are incomplete and asymmetric information is endogenous to the contract (Mas-Colell et al., 1995). Therefore, they must include incentive mechanisms that align the interests of the agent with those of the principal and incur monitoring costs to minimize moral hazard (Jensen & Meckling, 1976). Ideally, both the information and the agent's action should be monitored, but monitoring is limited (Pratt & Zeckhauser, 1985).

Agency costs are higher the more divergent are the interests between the principal and the agent and the more expensive the monitoring will be (Pratt & Zeckhauser, 1985). The reduction in the welfare experienced by the principal due to the divergence of interests is also a cost of the agency relationship and is called a residual loss. According to Jensen and Meckling (1976), agency costs are defined as the sum of: “the monitoring expenditures by the principal, the bonding expenditures by the agent, the residual loss”(p.308).

As argued by Pratt and Zeckhauser (1985), we infer that agency relationships are recurrent in companies and exist in the most varied forms, which allows us to explain how companies are organized. It is concluded that the Agent-Principal model describes the origin and consequences of the post-contract information asymmetry (moral hazard) and raises the question of the delegation of tasks between the parties.

AGENT-PRINCIPAL MODEL

Within the Agency Theory, to express the utility of the principal, a Von Neumann-Morgenstern type function is used as follows (1):

$$B(r - w) \quad (1)$$

So that r represents the observable result for the principal and w the cost related to the incentives for the agent to correspond to the interest of the principal. The result of function (1) depends on the task performed by the agent and indirectly on his effort.

The agent has its objective function as follows (2):

$$U(w, e) = u(w) - v(e) \quad (2)$$

Equation (2) expresses the relationship between incentives (w) and effort (e) exerted by the agent (understand e as a cost to the agent for the actions delegated to him). Effort has a positive relationship with principal costs, that is, greater agent effort entails higher principal cost, which can be represented as the disutility function represented by $v(e)$. In the same way, it happens with the incentives (w) which must be greater, as the effort (e) of the agent

increases.

The agency relationship between the principal and the agent is based on a contract with a validity period, offered to the second in such a way that the latter cannot negotiate, leading the agent to two options, accept or reject the contract. The main one aims to anticipate the agent's behavior in order to maximize his utility, said relationship is expressed as follows:

$$\text{Max}_{e, \{w(r_i)\}_{i=1, \dots, n}} \sum_{i=1}^n p_i(e) B(r_i - w(r_i)) \quad (3)$$

s.a:

$$\sum_{i=1}^n p_i(e) u(w(r_i)) - v(e) \geq \underline{U} \quad (4)$$

$$e \in \arg \text{Max} \{ \sum_{i=1}^n p_i(\hat{e}) u(w(r_i)) - v(\hat{e}) \} \quad (5)$$

According to equation (3), the principal seeks his expected utility function subject to two restrictions, the first one represented by equation (4), the agent's participation restriction, refers to the satisfaction of a utility in line with the contract that is greater than its reserve utility (\underline{U}), according to (Costa et al., 2016), represents the minimum value that should induce you to participate in the contract. The second restriction is expressed through equation (5), related to the compatibility of incentives, and represents the possibilities of levels of effort that the agent can choose according to the payment that the principal defines him and that also allows him to maximize his utility. The issue of moral hazard is implicit in equation (5), since if the agent accepts the contract, his effort will not be observed by the principal and, therefore, exerting a level of effort that maximizes the objective function of him.

In short, the agent can assume two levels of effort, being high effort (ea) and low effort (eb), so that $e \in [ea, eb]$, the disutility of effort is effort symmetric, that is, a higher level of effort generates greater disutility for the agent $v(ea) > v(eb)$. It is assumed that $p_{ia} = p_i(ea)$ and $p_{ib} = p_i(eb)$ for all $i \in \{1, \dots, n\}$, where p_i represents the probability of obtaining the result r_i when the agent offers a certain high or low effort. The probabilities are considered positive, that is, $p_{ia} > 0$ and $p_{ib} > 0$.

If the effort demanded by the principal is low, the case of symmetric information is given, since there is no problem of moral hazard, since the level of effort desired by the principal by the agent will be obtained, that is, the low level of effort. However, if the principal demands a high effort, the agent will not necessarily offer this same level of effort, so there is a problem of moral hazard, an alternative to mitigate this problem is to propose a contract depending on the final result, so the agent has an incentive to align with the principal's objective, formally:

$$\sum_{i=1}^n p_i^a u(w(r_i)) - v(e^a) \geq \sum_{i=1}^n p_i^b u(w(r_i)) - v(e^b) \quad (6)$$

$$\sum_{i=1}^n [p_i^a - p_i^b] u(w(r_i)) \geq v(e^a) - v(e^b) \quad (7)$$

The term $\sum_{i=1}^n [p_{ia} - p_{ib}] u(w(r_i))$ is interpreted as the well-being achieved by the agent from the remuneration w , while the term represented by $v(ea) - v(eb)$ is the gap in his effort level, where the level is chosen as high if the agent's expected profit gain from this effort is greater than his disutility, that is, his implicit cost.

The principal optimization problem to achieve an optimal level of effort schedule is as follows:

$$\text{Max}_{\{w(r_i)\}_{i=1,\dots,n}} \sum_{i=1}^n p_i^a (r_i - w(r_i)) \quad (8)$$

s.a:

$$\sum p_i^a u(w(r_i)) - v(e^a) \geq \underline{U} \quad (9)$$

$$\sum_{i=1}^n [p_i^a - p_i^b] u(w(r_i)) \geq v(e^a) - v(e^b) \quad (10)$$

Equation (8) is understood as the objective function of the principal, (9) is the participation restriction and (10) the incentive compatibility condition. To identify candidates for optimal contracts, the Khun-Tucker rule used to deal with optimization problems involving inequalities is used. Using the previous equations and applying the Lagrangian we arrive at:

$$\begin{aligned} \mathcal{L}(\{w(r_i)\}, \lambda, \theta) &= \sum_{i=1}^n p_i^a (r_i - w(r_i)) + \lambda \left[\sum_{i=1}^n p_i^a u(w(r_i)) - v(e^a) - \underline{U} \right] \\ &+ \theta \left[\sum_{i=1}^n [p_i^a - p_i^b] u(w(r_i)) - v(e^a) + v(e^b) \right] \quad (11) \end{aligned}$$

Applying the first order condition when deriving with respect to w , we obtain:

$$\frac{\partial \mathcal{L}}{\partial w} = -p_i^a + \lambda p_i^a u'(w(r_i)) + \theta \sum_{i=1}^n [p_i^a - p_i^b] u'(w(r_i)) = 0 \quad \forall i \quad (12)$$

Rearranging:

$$\frac{p_i^a}{u'(w(r_i))} = \lambda p_i^a + \theta [p_i^a - p_i^b] \quad \forall i \quad (13)$$

Then applying the sum and considering that $\sum_{i=1}^n p_i^a = \sum_{i=1}^n p_i^b = 1$, one arrives at:

$$\lambda = \sum_{i=1}^n \frac{p_i^a}{u'(w(r_i))} > 0 \quad (14)$$

The term obtained in (14) shows that the Khun-Tucker condition with respect to the participation restriction multiplier λ is fulfilled, since $\lambda \geq 0$, this condition leads to a positive incentive multiplier $\theta \geq 0$. By dividing both sides from equation (14) by p_i^a , it can be represented as:

$$\frac{1}{u'(w(r_i))} = \lambda + \theta \left[1 - \frac{p_i^b}{p_i^a} \right] \quad \forall i, \quad \lambda > 0, \quad \theta > 0 \quad (15)$$

The moral hazard problem generates a positive cost on the part of the principal, since the incentive multiplier $\theta > 0$, leading to always lower welfare when there is asymmetric information. Finally, the lower the ratio p_i^b/p_i^a , the greater the incentive per share of the principal, the greater is p_i^a in relation to p_i^b , the greater the probability of obtaining a high-level effort, so the principal that avoids risks must offer a payment to the agent that minimizes the chances of a low-level effort, so incentives should be offered to the agent.

RESULTS

The exploration relationship of the dairy activity in Argentina has been controlled since 1999 by Law N° 25.169 known as the Dairy Farm Associative Contract. One of our results is to show that there is an agency relationship in the sense of Jensen and Meckling (1976), understood as a contract where the Owner-Entrepreneur hires the Associated-Tamboero to perform a service on his behalf which implies delegating some authority to make decisions.

According to Article 3 of the law, the "business purpose is exclusive to the tambo, production of liquid milk, from a herd, regardless of the major or minor breed of cattle, their transfer, distribution and destination" (Argentina (AR), 1999). In fact, it is a set of continuous acts, which only end by mutual agreement and are not exhausted in the first production (Wilde, 2001). Therefore, the main objective function is the production of fluid milk.

In the context of the agency relationship and in accordance with Article 3 of the law in question, the principal is the Owner-Entrepreneur (owner/s) and can be a natural or legal person who is the owner or lessee and is the owner of the rural farm, the facilities, the assets and the immobile that are involved in the activity. The agent is the Associated-Tamboero, a natural person who performs all the necessary functions for the operation of the dairy farm, contributes with the use of equipment, machines, technology, that belong to his property, with or without personnel in his charge (Argentina (AR), 1999). According to (Wilde, 2001), the Law does not establish differences between the parties, placing it in equal rights and obligations.

From the point of view of the Agency Theory, the welfare of the Owner-Entrepreneur also depends on the actions taken by the Associated-Tamboero. Figure 1 presents a diagram that illustrates the agency relationship and brings particular and common obligations and incentives.

The contract establishes as common obligations, in accordance with Article 8, the development of the dairy based on technical and practical initiatives that contribute to its better functioning and ensure compliance with animal health regulations. If any of the parties hires personnel for the development of the dairy activity, they are obliged to comply with current labor, social security and tax obligations, without any solidarity between the parties or with third parties.

According to Jensen and Meckling (1976), the Owner-Entrepreneur and the Associated-Tamboero are utility maximizers, so there are good reasons to believe that the desires and goals between the principal and the agent are in conflict, giving rise to post-contractual information asymmetries, that is, moral hazard (Mas-Colell et al., 1995).

In this sense, the Owner-Entrepreneur does not have the ability to directly observe the action of the Associated-Tamboero (Varian, 1992) who, in turn, can know more about the task to be carried out in the dairy than the principal (Pratt & Zeckhauser, 1985), or you can take an action that affects your utility and also that of the Owner-Entrepreneur (Salanié, 2005).

The Owner-Entrepreneur cannot force the drummer-partner to choose an optimal level of Pareto effort, he can only condition the agent's utility by granting him a transfer that depends on the result (Salanié, 2005). Therefore, the Owner-Entrepreneur must draw up an incentive scheme, on the part of the principal, so that the partner-also-partner makes the appropriate effort (Varian, 1992).

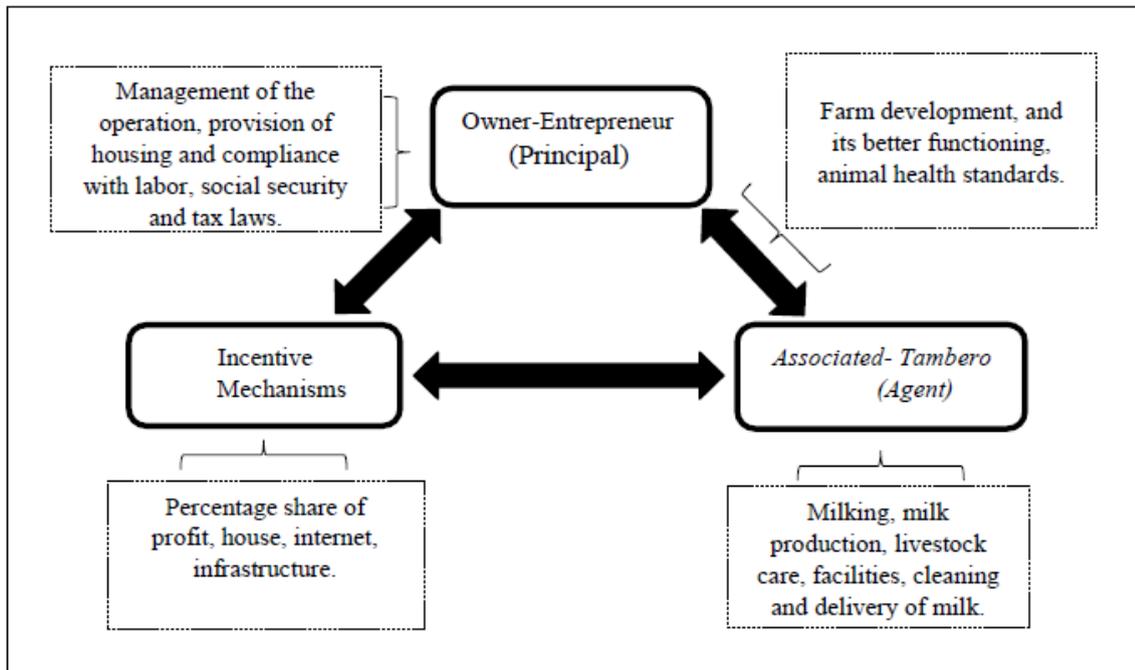
In fact, the parties seek to develop contracts that reduce the difficulties that cause information asymmetry (Mas-Colell et al., 1995). In this case, the Dairy Farm Associative Contract, according to Law N° 25.169, has certain characteristics: it is bilateral, burdensome, commutative and is called successive execution (Wilde, 2001). The Agency Theory considers that a contract can be formal or informal, in this case the Dairy Farm Associative Contract it is formalized based on a request to the civil court by one of the parties.

The contract is understood as a promise between the two parties in which their obligations are specified for different situations, in the sense that the partner-inhabitant will

maximize a utility function of the Owner-Entrepreneur subject to some restrictions (one utility can be thought in terms of profit or well-being) based on verifiable clauses by the principal and by an external member who endorses the contract, in this case an Argentine judge.

Figure 1

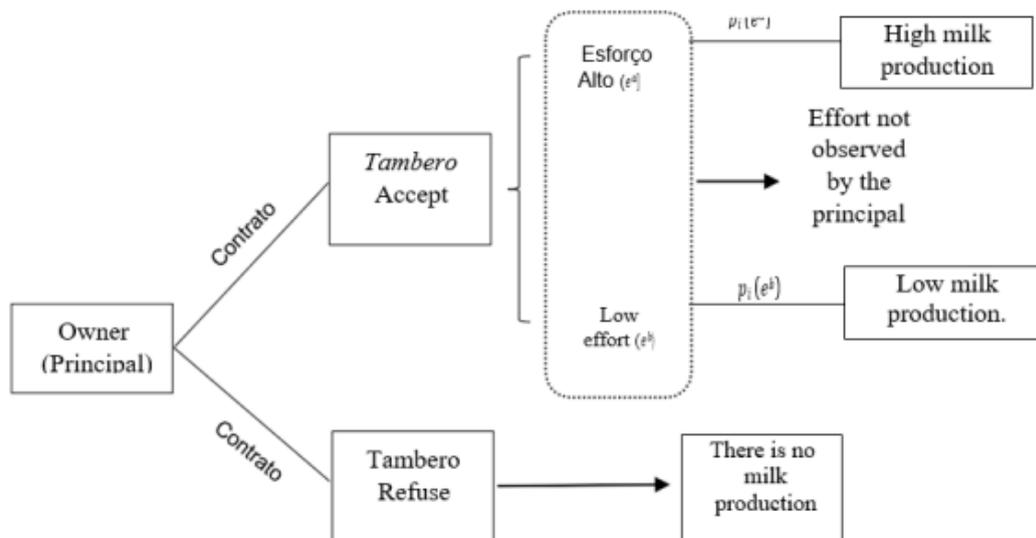
Flow of the Agent-Principal relationship in the dairy sector



Prepared by the authors.

Figure 2

Agency relationship in Argentine milk production



Prepared by the authors.

According to the Agent-Principal model, the sequence in time is as follows: the Owner-Entrepreneur projects and proposes a contractual relationship to the partner-too, which he can only accept or reject without being able to propose another contract. This contract is a trade-off between shared risk and incentives (Salanié, 2005). The tambero will accept the contract if it guarantees him a benefit greater than or equal to other opportunities available to him (reserve salary). If he accepts, then he will perform a high or low action or effort and will have a performance that will allow the director to achieve his goals, given the incentive mechanisms. Figure 2 shows the main agent model and the dairy production actors according to the Dairy Farm Associative Contract.

The Agent-Principal model also provides incentive mechanisms that align the interests of the agent with those of the principal, incurring monitoring costs to minimize moral hazard (Jensen & Meckling, 1976). Therefore, the Agency Theory makes agency costs visible, which are higher the more divergent the interests are between the Owner-Entrepreneur and the dairyman-associate (Pratt & Zeckhauser, 1985). According to Jensen and Meckling (1976), the agency costs incurred by the Owner-Entrepreneur are the sum of the follow-up costs, the guarantee costs of the dealer-associate and the residual loss.

From an analytical point of view, the utility of the Owner-Entrepreneur depends on the observable result of activity r , that is, the entry into milk production, and its costs inherent to the incentives for the tambero to correspond to the interest of the principal, where the result of the Von Neumann-Morgenstern utility function depends on the task performed by the agent and indirectly on his effort.

Therefore, if the tambero accepts the contract, there are two levels of effort on the part of the agent, the high effort (ea) or the low effort (eb), with the probability of occurrence being positive in both cases. If the effort is high, the production of liters of milk will also be high, otherwise, with a low effort, the production will also be low, remembering that the level of effort of the agent is not observed by the principal directly.

As it is assumed that the principal will require a level of effort commensurate with higher results, there will be the problem of asymmetric information, since the principal is not able to observe all the actions of the tambero in the activity, creating moral hazard problems, even more so in establishments that are not strictly family-owned. It is also worth emphasizing the possibility of misalignment of the level of effort required and offered.

According to Gastaldi et al. (2020), for the 2018 - 2019 productive year, the average production per farm was 2.918 l/day and the price of milk was on average 0,273 USD/l (considering a dollar of \$38,56/USD according to the Central Bank of the Argentine Republic). However, of a sample of 175 dairy farms located in the Pampas region of Argentina, 47% produce less than 2.000 l/day; 30% between 2.000 to 3.999 l/day; 21% between 4.000 and 9.999 l/day, and 3% more than 10.000 l/day.

In relation to the direct expenses of the activity, around 50% was for the feeding of the cattleⁱⁱⁱ and 20,3% was for labor, including the family remuneration attributed to operational tasks and the salaries of the workforce. The average percentage received by the hired labor was 11,75% of the income from the sale of milk^{iv} (Gastaldi et al., 2020).

However, while direct expenses represented around 71% of sales income, after discounting the structure, amortization and management compensation expenses, the income was obtained from the capital that remunerates the invested capital, that is, the profitability was an average of 2,2% (-3,01% for establishments with less than 100 cows and 7,68% for those with more than 220 cows). Dairy farms with positive profitability had higher productivity of the land factor and the labor force (Gastaldi et al., 2020). Baudracco et al., (2014), warns that in Argentina there is low efficiency considering the number of people who milk and the number of animals, due to cultural factors and inadequate infrastructure^v.

Then the tambero will receive his corresponding remuneration as agreed between the parties, thus, the objective function of the agent depends on his percentage of participation, that is, his incentives and his level of effort exerted by him also in the activity, considering that the greater the effort, the greater its disutility.

In this sense, the agent has its objective function according to formula (2), which expresses the relationship between the incentives (w) and the effort (e) exerted by the agent. The effort of the Associated-Tambero has a positive relationship with the costs for the Owner-Entrepreneur, a greater effort on the part of the agent entails a greater cost on the part of the principal, which can be represented as the disutility function represented by $v(e)$. In addition, the incentives (w) directed to the agent must be greater, the greater his efforts (e), for the same level of utility.

In this way, the objective function of the Owner-Entrepreneur is subject to the existence of a relationship between the remuneration of the Associated-Tambero that is greater than his disutility, that is, what the tambero receives must compensate for his level of disutility in order for him to accept the contract, this relationship is called a condition of participation. The second restriction on the part of the entrepreneur is that the well-being achieved by the tambero is greater than the gap in his level of effort, so a higher level of effort must be compensated by a greater profit in profit, which is called the condition of incentive compatibility. Therefore, from the point of view of Agency Theory, the Owner-Entrepreneur seeks to anticipate the behavior of the tambero associated with the objective of maximizing his utility.

As the tambero receives an agreed percentage, it is natural to associate a higher level of effort and therefore productive efficiency, the higher their participation in the dairy income, however, this implication has a greater effect the larger the dairy size. There are several studies in Argentina and abroad that exemplify the levels of effort that a tambero makes. In this sense, in Baudracco et al. (2014), it is established that a dairy farm with 144 VO and two people has an average of 1,8 hours to do the milking routine 31 and 0,6 hours to clean the facilities. In small dairy farms (average production of 1,208 l/day and 71 VO), the routine milking time was 1,3 hours and 2,4 hours in large dams (average production of 5.010 l/day and 225 VO) (Baudracco et al., 2014). The milking routine is performed twice a day^{vi}, at dawn and in the afternoon, in this sense, Lazzarini et al. (2019), it is specified that in most dairy farms milking is done at dawn before 4 am. Furthermore, in Baudracco et al. (2014), it is postulated that since there is no frank system and breaks, this makes the activity less attractive, the average Associated-Tambero works 10,4 hours a day and has 2,7 days off per month and 8 days of vacation per year.

In addition to monetary compensation, Article 9 of Law N° 25.169 specifies that the Owner-Entrepreneur must provide a functional and habitable house for the Associated-Tambero, his relatives and his dependents. In practice, the expenses of electricity, house maintenance, taxes and other basic services are paid by the owner according to his will or agreement. However, it is worth noting that the tambero has little decision-making power in relation to the accommodation provided, which can be understood as something negative for his well-being.

Regarding rural houses, in Gastaldi et al. (2020), it is specified that on average they are located at a distance of 3 km from a road in conditions (max. 20 km) and 4,5 km from a primary educational center (10 km max.). According to the opinion of the producers, approximately 47% of the rural houses where the tambero lives had a good state of habitability, with an indoor bathroom and hot water throughout the house. However, there are cases where there is no hot water supply system and the bathroom is outside the house (7%).

Regarding the payment of Associated-Tambero, finally we want to highlight that “although the wages are similar to those paid to commercial workers, they seem low, considering the nature of the work carried out on the farms” (Lazzarini et al., 2019, p.430). Another observation is that by contract a production area is not assigned for self-consumption,

so there is a decrease in the agent's global income (Sandoval et al., 2017). In addition, the owner, who by law is responsible for the management and administration, does not have to assume social security, labor, tax and social security obligations with the tambero. It is also worth noting that, although by contract the tambero identifies himself as a person (generally a man), in practice it is a family that is in charge of the tasks.

Considering all the above, it is necessary to contextualize the present analysis in the primary dairy sector in Argentina. Historically, this dairy sector has been characterized by a marked heterogeneity among the productive agents (Vértiz, 2017). Regarding the productive structure of the farms, in addition to the geographical location (Castignani et al., 2005), strong contrasts are evidenced by the size of the establishment, the type of feeding of the herd (Galletto, 2018), the adoption of technology, management, infrastructure and work organization (Baudracco et al., 2014; Gastaldi et al., 2020).

For the month of May 2021, approximately 370 dairy farms were registered with a production of more than 10,000 liters per day, which represent 3,7% of the total dairy farms and contribute 23,2% of the total production; while the nearly 5.400 dairy farms with less than 2.000 liters per day (54,1% of the total dairy farms), contribute 18,3% of the national production (OCLA, 2021). This heterogeneity has its implications in the incentive mechanisms of those agents that maintain a contractual relationship governed by the No 25.169, since their monetary remuneration is a percentage of production, and non-monetary incentives also have a relationship with the type of establishment. It should be noted that in Baudracco et al. (2014), it is highlighted that the percentage that employees receive depends on the size of the dairies, being lower in dairies with higher milk production, where an average of 16,4% was evidenced in small dairies (1.208 l/day), 12,7% in medium (2.381 l/day) and 9,6% in large (5.010 l / day).

In addition, it is necessary to highlight that comparing the years 2010, 2019, 2020 and 2021, there is a decrease in the number and volume of production of dairy farms with less than 2.000 l/day, although the share of establishments is above the 10.000 l/day of increments. The concentration of production in larger units is a continuous process with annual reduction rates in dairy farms around 2 to 3% in Argentina (with 4% in the main dairy countries of the world) (OCLA, 2021). However, the associative dairy contract has not been conditioned according to the reality of the sector (Vértiz, 2018).

Finally, in this work, some limitations of the Agent-Principal model are identified to be considered in the interpretation of the contract Dairy Farm Associative Contract. In this sense, in the international literature is that, although the associative contract establishes milk production as an objective function of the principal, and the Agency Theory assumes that the parties are rationally economic and utility maximizers, in the practice it is clear that the owners have other interests (achieving a balance between work and personal life, by reducing the hours dedicated to dairy activity, while increasing the size of the dairy herd by outsourcing tasks).

Another factor evidenced, is that the Agent-Principal model does not consider causes for termination of the contract after it is signed. However, in Article 10 of Law N° 25.169 the following causes for termination of the contract are detailed: due to death or disability of the member, when one of the parties requests the termination of the contract because the other party has not fulfilled its obligations, harming the normal development of the company, and violating the provisions of the regulations or the agreement. The death of the principal does not terminate the contract, continuing its validity with the successors until its termination. In addition, from the legal point of view, it is established that everything not provided for in Law N° 25.169 is framed by the norms of the Argentine Civil Code (Wilde, 2001).

Regarding the legal nature of the relationship, Sandoval et al. (2017), questions the autonomy of the worker, in addition to showing a strong doctrinal and jurisprudential debate, since the contract could be legally interpreted as a special type of agricultural work by contract or as an associative relationship, with different implications. In turn, in Vértiz (2018), it is postulated that the contract privileges control by the owner and the diversification of risks in

the face of a drop in income or production due to internal causes (problems with the herd and production), and external (climatic adversities, drop in milk prices, crisis in the sector, etc.). These post-contractual considerations and legal interpretation, not considered by Agency Theory, and have great importance in practice.

CONCLUSION

The present work had as objective to analyze the Dairy Farm Associative Contract by the Agent-Principal model. Dairy production is characterized by a high demand for jobs, but the literature review did not show an extensive application of the Agency Theory in dairy farms in Argentina. However, from other approaches, there is a growing interest in the management of employees and related tasks, the relationships of employees with supervisors, their profile and the factors that affect satisfaction, longevity and hiring.

National Law N° 25.169 details the aspects of the contractual regime, the legal nature, purpose, duration, remuneration, provisions and social and tax provision, labor matters and the obligations of the parties involved in the contract. The legal nature of the contract is agrarian, being configured as a partnership relationship.

In this sense, one of our results is to show that there is an agency relationship in the sense of Jensen and Meckling (1976), understood as a contract where the Owner-Entrepreneur hires the Associated-Tambero, to perform a service on his behalf, which implies delegating certain authority for decision making, the object of the business is the production of liquid milk. One assumption is that the Owner-Entrepreneur and the associated Associated-Tambero have different objectives, leading to post-contractual information asymmetries, that is, moral hazard. Furthermore, from the point of view of theory, the well-being of the Owner-Entrepreneur depends on the actions taken by the Associated-Tambero, but the principal does not have the ability to directly observe the action Associated-Tambero. Therefore, the Owner-Entrepreneur must condition the agent's utility with an incentive scheme so that he or she makes the appropriate effort.

According to the model, the sequence in time is as follows: the Owner-Entrepreneur proposes a contractual relationship to the Associated-Tambero, which he can only accept or reject without being able to propose changes or another contract. The agent will accept the contract if it guarantees him a profit greater than or equal to other opportunities available to him (participation restriction) and will perform a high or low action or effort with a performance that will allow the principal to achieve his goals, given the incentive mechanisms (restriction of incentive compatibility). One of the contributions of this theory is that it exposes the inability of the Owner-Entrepreneur to verify the action of the Associated-Tambero, as well as that the agent conditions his utility according to his level of effort, for which he needs to design incentive mechanisms based on the results of the agent and established in a contract. In addition, the importance of monitoring is highlighted. Another contribution is the visibility of agency costs which are higher the more divergent the interests between the parties and avoid the company from reaching its potential productive.

However, although the Agency Theory anticipates the difficulty of foreseeing all possible future situations, therefore it considers that the contracts are incomplete, it does not consider causes of recession and post-contractual renegotiation, nor does it give the agent negotiating power. In addition, it has been shown that the objectives of milk producers are not reduced to increasing production or maximizing its utility, they also seek a balance between work and personal life in the face of work stress, isolation, economic difficulties and other demands. In addition, the literature shows that the objectives of milk producers are not limited to increasing production or maximizing its utility, they also seek a balance between work and personal life in the face of work stress, isolation, economic difficulties and other demands. In this sense, future studies with other approaches within contract theory could deepen post-contractual problems that cannot be explained by Agency Theory and are of great relevance in practice.

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ⁱ Mas-Colell, Whinston and Green (1995) state that there are divergences in the literature on the use of the term moral hazard. The authors consider the problem of the action and the hidden information separately, postulating that there is moral hazard when the principal cannot observe if the agent makes an adverse effort and selection, when the agent knows more than the principal at the time of celebrating the contract. However, other authors use the term moral hazard, referring to actions or hidden information, for example, Hart and Holmstrom (1987).

ⁱⁱ It is necessary that these actions can be verified by the principal and also by any court that has the ability to fulfill the contract (Mas-Colell et al., 1995).

ⁱⁱⁱ The expenses of feeding the cattle, includes the expenses of pastures, preserved forages (silo and hay) and concentrates; whose purchase prices were in average \$6.55/kg for balanced, \$7.66/kg for soybean bagasse and \$4.81/kg for corn in grain in 2018-2019 (Gastaldi et al., 2020).

^{iv} In fact, the average cost of hired labor, paid and in percentage, was approximately \$466.250 year/person (average

\$38.853/month and minimum \$8.651/month; maximum \$110.290 month) (Gastaldi et al., 2020).

^v In Argentina there is a low labor efficiency, 40 cows per person, compared to other countries with extensive production systems, such as New Zealand, where there are between 150 and 200 cows per person (Lazarrini et al., 2019).

^{vi} The milking routine usually consists of the following steps: washing the teats (in some also drying the teats); elimination of the first jets of milk to see its appearance, detect diseases, eliminate contaminated milk and promote descent; positioning the milking unit correctly and sealing the teats after milking to prevent disease. Optionally, in some dams teat disinfection is carried out before milking.