

# **The organizational forms of agricultural production corporations in Brazil: capital and land ownership structures**

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## **Abstract**

Family organizations registered in the name of the owner have been traditionally predominant in the population of farms. The growth of agricultural land prices and foreign direct investment during the last decade have favored the emergence of the agricultural production corporations with professional management, especially in the segment of large-scale production. The research question in this study is the following: what are the organizational forms of agricultural corporations in Brazil? The general objective is to propose a framework to analyze the organizational forms for capital and land ownership structures in agricultural corporations in Brazil. A sample of 19 groups showed that the limited company is the predominant legal registry for foreign and national groups. Foreigners control less area than nationals and adopt the strategy of land formation (purchase, development and sale with profit), leading to a structure of land ownership more hierarchical than nationals.

**Keywords:** agroholding; large scale production, agriculture

## **1. Introduction**

This study deals with the organizational forms of agricultural production corporations, defined here as profit oriented companies operating in agricultural production with high scale, various types of property structures and institutional arrangements for the coordination of production transactions. The emergence of agricultural corporations is part of the ongoing transformations in agriculture, traditionally conducted in establishments with individual farmer registration (Hermans et al., 2017; Balmann & Valentinov, 2016). This process may be associated with land valuation, growth in commodity exports, and direct foreign investment in agriculture in the last decade (FAO, 2013, Deininger & Byerlee, 2012)

The phenomenon of corporate farms is global and have been studied under different aspects, such as the impact of adverse state legislation in USA (Schroeter, Azzam, & Aiken, 2006) and the strategic role of corporate transparency in Ukrainian agroholdings (Gagalyuk, 2017). Other researches in this field treated of environmental and climatic impacts of Australian corporations (Plunket et al., 2017), scale farming operations in China (Huang, Guan, & Jin, 2017), and the role of farming networks in Argentina (Senesi et al., 2017). In Central and Eastern regions of Europe, corporate farms tend to specialize in high capital intensity products and low labor monitoring requirements, while Family farms specialize in products with a higher labor-monitoring requirement (Ciaian, Pokrivcak, & Drabik, 2009).

Some research efforts have been made to explain the organizational forms of the agricultural production units. In this field, we can highlight three approaches. First, to consider the principal-agent relationship to justify the predominance of family farms (Allen & Lueck, 1998). Second, associate the attributes of the assets involved in the production as determinants of financial structure (Mondelli & Klein, 2014). Third, the choice of organizational form and structures of governance of global farmers in response to property rights enforcement and measurement costs of the transactions (Karantininis & Zylbersztajn, 2007).

This article contributes to the field specifically in the comprehension to the choice of organizational form by large-scale agricultural firms in terms of capital and land ownership structures, based on evidences in the research context of Brazil.

There is an expansion of these organizations in Brazil in cultivated area, mainly in regions of agricultural frontier. For instance, in 2013 there was ten groups operating grain production in a continuous area of nearby one million of hectares in new agricultural lands. (Freitas Júnior, 2013a, 2013b). The characterization of these companies in Brazil have not yet

been extensively addressed in the literature of agribusiness organizations. There are few case studies, such as one related to organizational architecture with decentralized management (Chaddad, 2014), an analysis of agency costs in corporations (Chaddad & Valentinov, 2017) and the research on social responsibility in a traditional family integrated group (Vergara, Silva, & Gomes, 2004). The lack of information about agricultural corporations in Brazil makes it difficult to formulate strategies for actors operating in agribusiness systems (banks, service providers, unions, cooperatives). For the government, the scarcity of information does not facilitate the formulation of public policies that may be necessary to deal with the activity.

In the broad theme of organizational forms, we choose analyze two aspects that seems to be relevant for agricultural corporations. First, the capital ownership structure, considering the options available for foreign and national investors to capture and consolidate the capital required for the large-scale operation. This decision is affected by the profile and intentions of control of the main stakeholders and the institutional environment. The second aspect is the land ownership structure, which can affect the financial results and return over investments of the corporation with the level of capital immobilized in land acquisitions. We treat land ownership structure as the level of vertical integration in land access transaction, considering the hierarchy for owned land and the hybrid form for renting land from third parties.

The research question in this study is the following: what are the organizational forms of agricultural corporations in Brazil? The general objective is to propose a framework to analyze the organizational forms for capital and land ownership structures in agricultural corporations in Brazil. The specific objectives are (1) to develop the subcategories of the framework, (2) to apply the framework to a sample of agricultural corporations.

For the capital ownership structure, the measures are: (1) origin of control (national, foreign), (2) type of control (family, partnership, fund), and (3) legal registry (limited company, corporation privately held, corporation publicly held). For the land ownership structure, the variables are: (1) land formation, which is the revealed strategy to buy, develop and sell land for profit (yes, no), (2) total land, including owned, rented from third parties and preserved by environmental rules (hectares), (3) owned land (the percentile of owned land over total land).

The article is organized in six sections, with this introduction. The next presents the theory and the framework related to organizational forms. The third section presents the context of agricultural corporations, and the fourth treats the methods used to construct the

sample of agricultural corporations and for the data analysis. The fifth section deals with the results and discussion, and the section five has the concluding remarks.

## **2. Organizational Forms**

In this section we discuss some theoretical aspects and empirical evidences of the issues of interest for the objectives of the study, first, the capital ownership structure, second, the land ownership structure, and present the framework to analyze agricultural corporations.

### *2.1 Capital Ownership Structure*

In order to explain the predominance of the family farm, Allen and Lueck (1998) argue that there is a trade-off between moral hazard, which occurs because of the biological nature of agricultural production, and the gains from specialization. They consider production information is asymmetric, and to avoid the results of moral hazard the most efficient form of agricultural production is the family farm, where specialization occurs within the productive unit. For these authors, nature imposes seasonal restrictions and random shocks, and the interaction of these attributes generates moral hazard, limits gains from specialization, and causes timing problems between stages of production. The production process involves several stages that are linked to biological processes (e.g., planting, flowering, and harvesting) and are required to be performed in certain moments of the year and under certain conditions (e.g., temperature and rainfall). A high degree of moral hazard is a problem because monitoring and evaluation is typically difficult and limited.

These authors argue that the agricultural production activities that succeed in controlling the effects of nature (i.e., reducing the effects of seasonality and random production shocks) have greater potential gains from specialization and lower monitoring costs of wage labor. As a result, firms in these activities will require higher levels of capital and, hence, will be more likely to use equity capital to fulfill their financial needs. The inverse also applies, the gains from specialization will be limited, and wage labor is expensive to monitor for farming activities that cannot control the effects of natural forces, with short or infrequent production stages, and that require few distinct tasks. Those activities, as confirmed by Allen and Lueck, will be better organized by family farms (as opposed to partnerships and corporations), which require lower capital investments. They applied their argument on farming systems in North America. Karantininis and Zylbersztajn (2007)

questioned these results based on the existence of many farms with intensive livestock production with a corporate structure in this region, if it is allowed by legislation of the state.

There are several financing options for a firm in the agricultural production sector, as pointed by Mondelli and Klein (2014). Farming enterprises must first choose between renting and buying land and, if buying, then between debt finance; if using equity, between internal equity (up-front investments from member–patrons) and external equity (contributions from external investors), and if using external equity, publicly traded and privately issued securities.

Agency theory has motivated a large volume of empirical studies in corporate finance. The main finding of the literature on agency problems is that the best way to deal with them is to put the agent on an optimal incentive scheme (Hart, 2001). Agency problems are reduced through an appropriate scheme that aligns the manager’s incentives with investors’ interests. Within agency theory, capital is assumed undifferentiated, and there is no suggestion that debt is better suited for some projects and equity for others (Williamson, 1988 p. 579).

Williamson (1988) argues that additional elements need to be taken into account to understand when it is optimal for a firm to use external equity finance. He develops an asset specificity approach to finance and argues that whether a project should be financed by debt or equity depends principally on the characteristics of the assets. Assets that are highly specific to the project will have lower value for other uses in case the project is liquidated (and has a lower salvage value). When the assets involved in a project/enterprise are highly specific and, hence, have lower value for other purposes, bondholders are subject to opportunistic behavior by the owner–manager of the firm, as bondholder have no control over firm management.

Following this approach, Mondelli and Klein (2014) tested the general proposition that the higher the level of asset specificity, the higher the probability a firm uses external equity finance. This proposition was deployed in hypotheses for the types of asset specificity (physical, temporal, site, and human) and applied in a dataset of 96 firms of agricultural production, in order to evaluate the effects in the decision of debt or equity adoption. The results suggest that asset specificity should be included in a model that attempts to explain organizational choices in agriculture and that physical asset specificity plays a relevant role in agriculture.

**Table 1.** Theories for capital ownership structure in agriculture

<b>Theory</b>	<b>Unit of analysis</b>	<b>Hypothesis</b>	<b>Reference</b>
Agency Theory	Agent – Principal relationship	Family farm with lower agent monitoring cost in agriculture than corporation	Allen; Lueck (1988)
Transaction Cost Economics	Transaction	Asset specificity of transaction favors adoption of equities rather than debt bonds	Williamson (1988)

Source: elaboration by the authors

In the Table 1 there are the main aspects of Agency Theory and Transaction Cost Economics related to capital ownership structure. We can see the differences in units of analysis, which is the relationship between agent and principal in the first and the production transaction in the second. If we consider that our analysis will be carried on a sample of companies and not family farms operating in agriculture, it seems that the hypothesis of Allen and Lueck (1988) won't be supported.

## *2.2 Land Ownership Structure*

In addition to the diversified capital ownership structure, agricultural corporations adopt complex arrangements to coordinate their activities. Land leases, subcontracting of planting, production and harvesting services are observed, as well as innovative arrangements that may include contracts with smaller producers, in addition to own production. In this case, it may be hypothesized that agricultural corporations may adopt decision-making processes distinct from traditional farms regarding the degree of vertical integration in land access and mechanization services), in view of not only the criteria for minimizing transaction costs (Williamson, 1991), but also the impacts of asset management on the organization's results.

For the level of governance analysis, the Transaction Cost Economics deals with the contractual aspect of organizations and the coordination of transactions with third parties, when considering the assumptions of limited rationality and opportunism of agents. Based on Coase (1937), the theory recognizes the existence of transaction costs to negotiate and monitor contracts considered incomplete to coordinate transactions. The basic theory hypothesis is that agents make a rational choice between governance structures (hierarchy, long-term contracts, and market). The structure adopted would be the most appropriate to the attributes of the transaction involved (frequency, uncertainty and asset specificity), seeking to minimize transaction costs (Williamson, 1991).

In the development of theory, the literature has accumulated a huge amount of empirical studies at the governance level, focusing on testing the hypotheses of alignment between transaction attributes and governance structures. One of the hypotheses most tested in the literature is that investment in specific assets in the transaction favors the adoption of governance structures that offer greater coordination, such as hierarchy or hybrid structures (contracts). For such studies, institutions are considered exogenous to the process of choosing the governance structure, since they are common to the partners and do not change in the time horizon of the data collection. In the vast majority of cases, evidence was found to support the hypotheses of the theory, as can be seen in the reviews of Macher and Richman (2008) and Ruester (2010).

Karantininis and Zylbersztajn (1997) analyzed the global farmer phenomenon, where entrepreneurs establish an activity in two distinct economic and institutional environments. In order to explain how global farmers choose institutional arrangements in terms of contracts and agreements, they adopt the transaction cost perspective and in particular the property rights theory of the firm as developed by Barzel (1997). In this framework, any transaction is a transference of a set of property rights, compounded by a number of specific dimensions that differ in terms of measurement costs of attributes being transacted as well as costs of the joint production effort. Institutional arrangements are designed to protect both economic and legal rights associated with production. Transaction dimensions that are easier to measure are coordinated by contracts and enforced by courts. Particular dimensions that are difficult to measure are considered too costly to be enforced by the state and are technically not contractible, being enforced by other means.

Based on this theory, these authors propose that complex transactions in agriculture (hybrid forms) are made partially by means of contracts and agreements. Depending on the relative ability of the institutional arrangements to protect economic and legal rights, it might be preferable to draft an agreement or contract. The authors consider that when farmers choose a particular crop to produce, they simultaneously choose the degree of complexity of the transactions to be carried out. Therefore, their social connectedness and local institutional characteristics limit the choices of activities to be developed. If the production technology demands many difficult-to-measure dimensions, then it is more difficult to contract.

The decision to make or contract mechanization services was analyzed by Mascarin (2014) in the context of sugarcane and soy production in Brazil. As a result of analysis of the institutional environment, it was shown that there are ambiguous rules regarding

subcontracting, which sometimes discourages and penalizes those who choose to hire. A sectorial analysis of the mechanical harvesting services market in the productive chains of soy and cane sugar was made through two case studies. In-depth interviews were conducted with providers and stakeholders of mechanized harvesting services. As a prominent result of the analysis it appears that the services arise from farmers (100%) who had decided to optimize their machines, and also that the majority (63%) operates informally.

The land access becomes particularly relevant for the agricultural corporation, due its impacts of capital structure, governance costs and revenue flows. While some companies prefer to expand the production by renting new areas of third parties, others search for profits from two sources: the agricultural activity and the gains of capital due to the land development.

In the Table 2 we present a comparison of the Governance and Measurement Costs approaches in Transaction Cost Economics. The first one is associated to a governance structure adoption to minimize transaction costs related to opportunistic behavior of the partner in a transaction, and the second is related to the adoption of contracts or agreements based on the property rights protection and the measurement costs associated with the attributes of the transaction.

**Table 2.** Theories for land ownership structure in agriculture

<b>Theory</b>	<b>Unit of analysis</b>	<b>Hypothesis</b>	<b>Reference</b>
TCE – Governance approach	Transaction	Governance structure for land access will be the most efficient in transaction costs	Williamson (1991)
TCE – Measurement cost approach	Transaction	Governance structure for land access will be the most efficient to protect property rights and to measure transacted attributes	Barzel (1982)

Source: elaboration by the authors; TCE –Transaction Cost Economics

### 2.3 The Framework

In this section we present the results of the conceptual elaboration for the framework for agricultural corporations.

The following paragraphs are related to the category Capital Ownership Structure.

*Origin of Control.* This issue could be ranked by two categories: (1) national; (2) foreign. This aspect is becoming more complex to be evaluated, considering the growth of global financial flows, since some foreign investor can register a local firm, or, by the other

hand, a local citizen can create a trust overseas to control a agricultural corporation in the home country. Even with these restrictions, the main aspect to be evaluated is the institutional environment related to foreign investments or land acquisition or renting.

*Type of Control.* This aspect could be evaluated by three categories: (1) Family, with the founder and relatives controlling the capital of the company; (2) Partnership or group, with the company owned by any kind of society, partnership or economic group; and (3) Fund, with the control by any kind of fund, such as hedge fund, pension fund or sovereign fund. These levels indicate different requirements of compliance to corporate governance and return over the capital or sales.

*Legal Registry.* This criterion is the type of organization according commercial rules in the country, or in regional legislations. It was applied to the concept of global farmer by Karantininis and Zylbersztajn (1997), with the following categories: (1) Migrant Farmer, when the farm is operated in the new country by an individual with a similar status the previous location; (2) Partnership, with the operation with any kind of association with in the new country with someone from his home country or with a local farmer; (3) Corporation, with a formal partnership and funding from the home country, often associated to more vertical integration; and (4) Multinational, with an existing multinational corporation that extends its activities in a new country or region.

In Brazil, the legal registry could be: (1) Limited company, with private control by a family or partners; (2) Corporation privately held, a society with private control without trading shares in the market; and (3) Corporation publicly held, a society with trading shares in the market. These categories have distinct levels of capital ownership concentration and complexity of management and reports for assets and results.

The following paragraphs are related to the category Land Ownership Structure

*Land Formation.* This aspect is one of the distinctive characteristics of some agricultural corporation, according previous studies. It is the option of the company to adopt the land formation, based on buying degraded or frontier lands, to invest with infrastructure and soil correction during agricultural production, and to sell the land with profit. This strategy is present in the case of Brasilagro (Chaddad, 2014), which explicitly count on this source of revenue in its business model. This category could be measured with secondary data, by searching in the website or official reports for mentions or declarations on the presence of this activity and the results obtained.

*Total Land.* This is one of the basic aspect to classify the organizations in agricultural production. In Brazil, the most recent official data on the scale of agricultural properties is of 2006, from IBGE, the Brazilian Institute of Geography and Statistics. According this source, the properties of more than 1,000 hectares represented only 1% of the total number of farms and occupied 44% of the land (OECD/FAO, 2015). This lack of information poses a challenge to use this category for agricultural corporation, since they are in this range and the data must be collected directly. Besides that, it will be necessary to create new ranges of area above 1,000 hectares. This criterion could be applied in the level of farm or the economic group. In this case, it is possible investigate the trade-off between the economies of scale and the cost of governance.

An evidence of this issue of scale management was showed by Chaddad (2014), when describing the case of BrasilAgro. He reports the business model of the company minimizes agency costs and allows the expansion with low cost equity capital from outside investors. According to the CEO, it was possible to create a high-performance agricultural production company by means of a well-designed organizational architecture. During the conception of the company, the goal was to minimize agency costs and align incentives between shareholders, corporate managers, farm managers, and employees. In doing so, the firm would be able to expand and benefit from economies of scale and scope, labor specialization, and professional management.

*Owned Land.* This subject is evaluated by the ratio of owned land and total managed land (owned land plus rented land from third parties). In this segment there are companies with strategic focus on buying, developing and selling lands, operating like a real state company for urban building construction. Another opposite profile is the corporation with focus on agricultural production, operating with the predominance of rented land. Between these poles, there is a variety of strategies with respect to the property rights on the land.

One restriction for these strategies in Brazil is a law prohibiting the purchase or lease of land by foreigners. Gilio et al. (2015) discussed the effects on sugarcane industry of restrictions on land acquisition by foreigners in Brazil, defended by LA-01, of August 19, 2010, written by the Attorney General of the Union (AGU) and approved by the President on the same date. Evidences collected from secondary sources indicate that the instability caused by the legal rules imposed by the approval and publication of this opinion has influenced the decision of foreign investment in the production of sugarcane ethanol industry, which is

dependent on long-term decisions of investments and assets of high specificity, in areas agricultural and industrial.

**Table 3.** Framework to analyze agricultural corporations

Category	Variables	Units
Capital Ownership Structure	Origin of Control	National / Foreign
	Type of Control	Family / Partnership / Fund
	Legal Registry	Limited Co. / Corp. Privately held / Corp. Publicly Held
Land Ownership Structure	Land Formation	Strategy to buy, develop and sell land (Yes / No)
	Total Land	Owned land + rented land from third parties (hectares)
	Owned Land	Percentile of Total Land (%)

Source: elaboration by the authors

Considering the exploratory character of this article, the proposed framework (Table 3) has two basic categories: capital ownership structure, and land ownership structure. The first one have the levels of origin of controlling interest, type of control and legal registry of the organization. The second involves the aspects of land formation, total land and owned land.

### 3. The Context of Agricultural Production Corporations in Brazil

Considering that most of the properties have family governance and registration linked to a rural producer, who is a natural person, one can expect the occurrence of management difficulties of these enterprises. The producer's difficulties stem from the need to manage not only the activities intrinsic to production, such as the purchase of inputs, soil preparation, planting and harvesting, but also support activities such as human resources management, finance and sales. In addition to the complexity of management to accompany technological innovations and competitive pressures from suppliers and buyers, one of the main risks to financial management on farms is the lack of barriers between producer and rural business assets and cash flows.

A classification of farms in four types is proposed by Kageyama et al. (2013), according to the composition of the labour force employed: exclusively family farm; land reform settlement (“assentado”); family farm with hired labour; non-family farm. Exclusively family farms are run by the owner and employ exclusively family labour; land reform settlements are also mostly family-run units; mixed family farms are run by the owner and

employ predominantly family labour, complemented by hired labour; non-family farms depend mostly on hired labour, with or without the help of the owner's family. Aspects such as area, gross production value, productivity and revenues are analyzed. One of the main results is that the family units are largely predominant in number (90% of the total) and employ 80% of the labour force in the agricultural sector, although they contribute with only 50% of the gross production, in virtue of lower productivity.

The non-familiar farms are 15.6% of the units and 75.7% of the total cultivated area, and all the agricultural corporations must be in this category. We should be aware that the attribute of familiar for these authors is associated to the use of family labor force in the agricultural production activities, and not to the concept of Family business used in corporate governance field. In order to apply this criterion for agricultural corporations, the modes could be (1) temporary workers and (2) permanent workers.

Brazilian agriculture has experienced strong growth for more than two decades, though not without crises in certain years, because of crop failures. Agricultural production more than doubled in volume compared to 1990 and meat production almost tripled (OECD/FAO, 2015). The reforms to trade liberalization and deregulation adopted since the 1990s have led to the progressive reallocation of resources to agricultural activities in which the country has a comparative advantage, in order to exploit the potential of international markets. The structure of agricultural holdings has undergone considerable changes with the departure of less efficient producers and the development of large agricultural enterprises that have exploited economies of scale and technical progress, especially in the Midwest.

According to the most recent Census of Agriculture, 2006, units of less than 20 hectares accounted for two-thirds of the total number of rural establishments in Brazil, but occupied less than 5% of agricultural land. On the other hand, the properties of more than 1,000 hectares represented only 1% of the total number of farms and occupied 44% of the land (OECD / FAO, 2015). Of the 4.4 million rural establishments validated in this census survey, only 500,000 accounted for almost 90% of the gross value of production. Of these, only 24,000 produced half the value (Navarro & Alves, 2016). These data suggest that, despite the problematic situation of social inequality in agriculture, a study of the characteristics of agricultural corporations, which integrates this small group of high-scale farms, may be of interest to academics and managers because of the representativeness of food supply to the country and the world.

In order to evaluate the reasons for the preference of the producers for their operation as individuals in relation to company registration, Roveri (2007) interviewed farmers and service providers, as well as simulating the tax burden of each option. The results indicated that the legal nature is indifferent to input suppliers, who consider the history of relationship with the producer. For financial institutions it seems to be safer to lend to companies because of the greater ease of recovering collateral in the event of default. The producers reported the custom of acting as an individual and the lack of knowledge about possible advantages of the legal entity. The simulations indicated a lower tax incidence for companies in relation to the individual.

Agricultural production corporation emerges as a new type of rural development that could improve the management of the activity. The legal nature of for-profit company limited type or corporation may result in a different operating mode of traditional farms. The agricultural corporation seems to be able to improve the management of agricultural production and the relationship with suppliers, buyers and financial institutions, generating a positive influence on efficiency in Brazilian agribusiness. The operation as a company facilitates access to long-term financing lines of development banks, individual investor resources, companies, private equity funds or private pension funds, national or foreign.

One agricultural corporation that excels in contract management is the Argentine group Los Grobo, which in 2009/10 has become the second largest grain producer in Latin America, growing 250,000 hectares to generate 2.6 million tons of grains and earn a revenue of USD 550 million. What is remarkable in this performance is that it is obtained without the ownership of the exploited lands and supported in a network of suppliers for the supply of inputs and services of risk management. According to statements by the chief executive, the model may indicate the future of global agricultural production by relying on knowledge rather than asset immobilization. In addition to operations in Paraguay and Uruguay, the group managed to explore 55,000 hectares in Brazil (Scott & Bell, 2011).

An analysis of the company Agrinvest reveals some differences between agricultural corporations and traditional farms. Founded in 2005 with funds from the American fund Ridgerfield Capital, Agrinvest has invested about USD 100 million since the beginning of its activities. In this harvest season 2012-2013 the company cultivated 77 thousand hectares and still has 22 thousand hectares available for expansion between Maranhão and Piauí. Despite the large area planted, Agrinvest keeps little capital immobilized on land. Of the almost 100,000 hectares it manages, only 12,600 are owned by it. The remainder is exploited by

means of leases with an average duration of 12 years. The company also limits its investments in machinery. Although it owns 95% of the equipment used in planting, all the spraying and harvesting activity is conducted by third parties. In 2012, Ridgerfield Capital sold its stake to a group of Brazilian investors (Freitas Júnior, 2013c).

#### **4. Methods**

We present the methodological procedures in this section. This article has an exploratory and qualitative analysis of the issue of the organizational forms of agricultural production corporations in the Brazilian research context. This approach can be justified by the lack of official data and previous research on this population. With respect to agricultural production data, public agents at federal level, such as Agricultural Ministry (MAPA) and Brazilian Institute of Geography and Statistics (IBGE), present some aggregate information for products, regions, states and cities from periodic surveys during each crop season. In this sense, these sources do not identify the type of productive units involved and the respective share, for the categories of legal registry.

As mentioned before, the last official data in the level of productive unit (farm) was for 2006, by the Census of IBGE. Even in this database, the farms associated to agricultural corporations could not be identified, since they should be included in the broad category of “non-familiar farmer”. The official data of firms of every sector, collected by Treasury Ministry for tax collection purposes are not available for searching in a disaggregated way, due to the restrictions of commercial legislation on access to firms’ registry data.

In order to overcome these restrictions on data availability, we conducted the following steps to construct a sample of agricultural corporations. First, search for data of agricultural corporations in rankings of agribusiness organizations in Brazilian business publications, such as “Melhores e Maiores” (Exame, 2016) and “Valor 1000” (Valor Econômico, 2016). We could search for the companies in the website of these publications in the period from 2011 to 2015. Second, we made contact with managers and leaders of private associations from agribusiness sector to collect the name of agricultural corporations. In this stage, at each contact, we showed to the respondent our list of companies to confirm the accuracy of the data and to ask for more organizations with the same profile. With these two procedures, we could collect a sample with the 19 largest groups in Brazil, according to the perceptions of the respondents.

With this group of companies, we started the collection of secondary data to construct an original database with relevant information to apply the proposed framework. We conducted the following procedures: (1) search for information on capital and land ownership structure in the websites of the companies, (2) search for academic papers or articles in business magazines, newspapers and websites.

When the database was complete, the data was analyzed with the framework and descriptive statistics. In order to present and validate the preliminary results, we organized an open seminar in November 2016 at the University of Sao Paulo with two experienced professionals in the subject of agricultural corporation. They were Fernando Jank, an independent business advisor with experience in the segment and Julio Toledo Piza, former CEO of Brasilagro, one of the main agricultural corporations in Brazil. Their contributions during the event were incorporated in the results of the article.

## **5. Results and Discussion**

In this section we present and discuss the results following the structure of the framework proposed.

The results for the category of Capital Ownership Structure, with the subcategories of Origin of Control, Type of Control and Legal Registry are in Table 4. We added in this table data of location of central office and date of foundation. The sample of agricultural corporations is composed by 19 groups, being 12 of national control and 7 of foreign control, being 3 from Argentine, 2 from USA, 1 from Japan and one from Canada. The presence of international capital in this segment is significant, even with the legal restrictions for land acquisition. It seems that these barrier have been overcome with partnerships with local agents.

Their central offices are located mainly in Southwest Region, with 14 in the state of São Paulo, with seven foreign groups and five local groups in the city of São Paulo and one in Ribeirão Preto, and in Midwest Region, with three in the state of Mato Grosso (MT). The concentration of the headquarters in the largest city in Brazil reveals the first distinctive characteristic of agricultural corporation, which is the ability to operate farms with long distances, since they can be located in the Midwest, Northeast and North regions. This option reveal a decentralization in the organizational structure that is not trivial for traditional

farmers, operating as individuals. Since all the foreign groups in the sample located their central offices in São Paulo (SP), this characteristic seems to be even more evident when compared to national groups.

With respect to the subcategory of Type of Control, the predominant mode is Partnership, with 8 cases, followed by Family, with 6 cases, and Fund, with 5 cases. As expected, the foreign groups present only Partnership (4 cases) and Fund (3 cases), resulting from investment strategies of international groups. For the subcategory of Legal Registry, we see the predominance of Limited Company, with 13 cases, followed by Corporation Privately Held and Corporation Publicly Held, both with 3 cases. This lower participation of corporations in this sample may reflect the institutional environment and transaction costs related to the operation with stocks in Brazil. Questions about volatility e even the size of the stock markets seems to refrain the movement of these groups in this direction. By the other hand, the status of organic growth of family controlled groups with national control seems to be more adequate for limited firms, due to the strict control they provide, with less pressure from the markets on issues of compliance and transparency.

**Table 4.** Capital ownership structure of agricultural production corporations

<b>Group</b>	<b>Origin of Control</b>	<b>Type of Control</b>	<b>Legal Registry</b>	<b>Central Office</b>	<b>Year of Foundation</b>
Adecoagro	Argentine	Partnership	Limited Company	São Paulo	2002
Agrícola Xingu	Japan	Partnership	Corp. Privately Held	São Paulo	2004
Brasilagro	Argentine	Partnership	Corp. Publicly Held	São Paulo	2006
Brookfield	Canada	Fund	Limited Company	São Paulo	1899
El Tejar	USA	Fund	Limited Company	São Paulo	1987
Sollus Capital	Argentine	Partnership	Limited Company	São Paulo	2008
Tiba Agro	USA	Fund	Limited Company	São Paulo	2009
Agrifirma	Brazil	Fund	Limited Company	São Paulo	2008
Agrinvest	Brazil	Partnership	Corp. Privately Held	Ribeirão Preto	2005
Amaggi	Brazil	Family	Limited Company	Cuiabá	1977
Cantagalo	Brazil	Partnership	Corp. Privately Held	São Paulo	2011
Grupo Bom Futuro	Brazil	Family	Limited Company	Cuiabá	1985
Grupo Horita	Brazil	Family	Limited Company	Barreiras	1984
Grupo JD	Brazil	Family	Limited Company	São Paulo	1990
Grupo Roncador	Brazil	Family	Limited Company	São Paulo	1978
Grupo Scheffer	Brazil	Family	Limited Company	Sapezal	1983
Insolo	Brazil	Partnership	Limited Company	São Paulo	2008

SLC Agrícola	Brazil	Partnership	Corp. Publicly Held	São Paulo	1977
Terra Santa	Brazil	Fund	Corp. Publicly Held	São Paulo	2006

The results for the category of Land Ownership Structure are in Table 5. In the sample, the Managed Area varies from 2,352 ha (Grupo JD) to 594,250 ha (Grupo Bom Futuro), with an average of 160,749 ha. As an aggregate, the foreign corporations have 961,850 ha in 73 farms, lower than the 2.09 millions of ha in 112 farms of the national corporations. The expansion of scale of production seems to be limited by governance costs in the level of farm and the group.

The data on Land Formation indicate a clear distinction between foreign and national corporations, since all of the companies in the first case adopt this strategy, and only two national corporation follow this option. This could be explained for the profile of the capital owners abroad when investing in primary sector in Brazil, particularly with respect to the profitability and the search for exit mechanisms for the investments. By the other hand, national groups have an origin in the agricultural production, and do not value at the same level the operations of buying and selling land, at least with the frequency observed in the groups with this explicit strategy.

**Table 5.** Land Ownership Structure of agricultural production corporations

Group	Land Formation	Number of Farms	Managed Area (ha)	Owned Area (ha)	Rented Area (ha)	Owned Area (%)
Adecoagro	Yes	11	33,690	33,690	0	100.0
Agrícola Xingu	Yes	4	116,000	116,000	0	100.0
Brasilagro	Yes	8	136,015	136,015	0	100.0
Brookfield	Yes	19	243,152	243,152	0	100.0
El Tejar	Yes	7	84,300	51,400	32,900	61.0
Sollus Capital	Yes	11	28,693	28,693	0	100.0
Tiba Agro	Yes	13	320,000	320,000	0	100.0
TOTAL		73	961,850			94,43
Agrifirma	Yes	3	71,276	71,276	0	100.0
Agrinvest	No	6	99,000	12,600	86,400	12.7
Amaggi	No	10	223,460	223,460	0	100.0
Cantagalo	No	4	146,739	146,739	0	100.0
Grupo Bom Futuro	No	29	594,250	594,250	0	100.0
Grupo Horita	No	6	150,000	150,000	0	100.0

Grupo JD	No	10	2,352	2,352	0	100.0
Grupo Roncador	No	4	40,000	40,000	0	100.0
Grupo Scheffer	No	11	108,000	26,000	47,000	24.0
Insolo	Yes	6	116,631	116,631	0	100.0
SLC Agrícola	No	14	377,000	377,000	0	100.0
Terra Santa	No	9	163,673	89,301	74,372	54.56
TOTAL		112	2,092,381			87,75

The data on property rights on land indicate a conservative profile of the corporations. For the foreign corporations, only one group presented a percentage lower than 100% for owned area, which was the group El Tejar, with 61.0%. These results seems to be consistent with the adoption of the strategy of land formation.

In the sample of national groups, we can see three groups with focus on renting land from third parties: Agrinvest, with 12.7% of owned land, Grupo Sheffer, with 24%, and Terra Santa, with 22.8%. Considering the lack of preference for land formation in national groups, the adoption level of renting land is lower than expected. This may be associate with some transaction costs in this market, related to the quality of the land titles, or the risk of opportunistic actions. For the adopters of renting, we see an aggressive strategy for the high participation of rented land. This option seems to be limited only by the minimum amount of owned land required by the bank to deliver loans for agricultural production.

## 6. Concluding Remarks

This article had the objectives to propose and test a framework to investigate the organizational forms of agricultural production corporations operating in Brazil. The variety of available organizational forms to operate poses a challenge for the choices of capital and land ownership structures. The results offered an overview of these issues for a sample of 19 agricultural corporations, which can be considered almost a census in the segment of large-scale agricultural production by profit oriented organizations in Brazil. This is a relevant contribution of the article, and to our knowledge there wasn't an earlier study with this characteristics.

For the capital ownership structure issue, the article could show a prevalence of national capital in controlling the corporations in terms of quantity of groups and managed area. This result indicate the organic growth of family controlled groups in agribusiness, and probably some barriers for the foreign capital due to international turbulences and some

aspects of the institutional environment related to the land market and property rights protection. The limited company is the prevalent legal registry, which can indicate the need for a high patrimonial control, similar to the operation as an individual, but with more flexibility to aggregate capital and to distribute profits to the partners. The forms of corporation privately held or publicly held seem to be inadequate at the evolutionary level of the majority of the groups, considering the governance and transaction costs.

The land ownership structure is diversified in terms of scale of production, but is remarkable that the average level is as high as 170,000 ha. The governance challenges of these structures present risks from the areas of production, market, weather and logistics. When searching for secondary data on these groups, we saw some histories of debt restructuring operations and even the change of the name of the group (Vanguardia Agro becoming Terra Santa). These are evidences that the operation with high scale production is risky, especially in remote areas of the country. The article suggest the need for new studies relating the impact of the scale of production on the profitability and the governance costs of agricultural corporations. Another remarkable result is the adoption of the strategy of land formation for all the foreign corporations, and almost ignored by the national groups. This suggest an implication on the possible imitation by these groups or for creation of a market for firms specialized in search, develop and sell agricultural land, operating with contracting agricultural operators for the development stage.

About the owned land issue, the results indicate the low level of adoption of rented land for production, an efficient option in order to reduce the immobilization of capital in land. Only by producing, the corporation promotes the leveraging of the value of land, and this asset may become too high to be carried in the patrimonial and lowers the return over the investments. Future studies should be conducted to evaluate what are the barriers for expansion of market for rented agricultural land.

The main limitation of the article was the lack of primary data in order to evaluate the determinants of the capital and land ownership structures. However, the proposed framework opens a research agenda for the elaboration of propositions and hypothesis for the categories involved, for future quantitative analysis.

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