ACCESSING SCARCE RESOURCES IN THE BRAZILIAN AMAZON

Voluntary Associations and Secure Land Title

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Abstract: This article builds on the literature on property rights and associational life in Latin America during and after transitions to democracy by assessing participation in voluntary associations as a determinant of land title. It uses survey data collected from rural properties near Santarém, Pará, to describe who participates in voluntary associations and, more important, whether participation in specific groups is aligned with possessing secure title, an important scarce resource in the Brazilian Amazon. This quantitative analysis shows that owners who participate in one union with state-controlled, corporatist roots are more likely to possess secure title to their land than those who do not participate. This systematic variation is important in an era of soy expansion, with a shift from small-scale subsistence farming to large-scale mechanized agricultural and a subsequent increase in land value.

The question of access and rights to land has been a central concern in Latin America for centuries. The control of land brings opportunities for social, political, and economic development and provides access to natural, political, and financial resources. In both urban and rural areas, rights to land have been at the center of many conflicts, and in recent decades frontier regions have become particularly contested areas. Technological advances and the mechanization of agriculture have led to the growth of large-scale farming in areas previously settled by small-scale farmers throughout the twentieth century. With increased possibilities for intensive farming practices, the value of land has increased. Formal land title, which is controlled by the government, is often necessary in order to sell land, and it reduces the risk of being evicted or having others claim the land as their own. As a result, the importance of holding secure land title can be crucial.

However, the process of obtaining formal land title, particularly in the Brazilian Amazon, is tedious, time consuming, complicated, and often very political in nature, making legal title difficult, if not impossible, for an individual to obtain. One technique used by rural landowners to assist in this long process—which

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can take from two to ten years—has been to band together in formal and informal groups, unions, and associations (Alston, Libecap, and Schneider 1996). In general, these organizations have full-time staff, are repositories of knowledge, act as gatekeepers for opportunities and information, provide technical assistance, and serve as liaisons between citizens and state agencies. While it is assumed that these organizations play a role in access to and support of land rights, empirical work on the connections between individual participation in particular groups and possession of secure title remains sparse.

This article builds on the literature on property rights and associational life in Latin America during and after transitions to democracy by assessing participation in voluntary associations as a determinant of land title in the Brazilian Amazon. Research in this region has shown the importance of rural unions in providing political and social spaces for changing conditions at the aggregate level (Alston, Libecap, and Schneider 1996; Houtzager 2001), but less is known about the relationship between these groups and individual land title. Using survey data from 218 self-reported owners of properties near Santarém, Brazil, collected by a team of researchers from the Universidade Estadual de Campinas (UNICAMP) and Indiana University in 2003, this study examines the determinants of title possession, paying particular attention to organizational participation. Specifically, I look at two unions formed during the military dictatorship, Sindicato dos Trabalhadores e Trabalhadoras Rurais de Santarém (STTR, the Santarém rural workers' union) and Sindicato Rural de Santarém (SIRSAN, the Santarém landowners' union), and one local organization founded in the first years of democracy, Associação dos Produtores Rurais de Santarém (APRUSAN, Rural Producers' Association of Santarém).

I show that property owners' age, wealth, and place of origin are associated in different ways with participation in each of these organizations. Specifically, young and wealthy owners from the local area are most likely to participate in APRUSAN, while more established, poorer property owners from Santarém have a higher probability of participating in STTR. I demonstrate that age, education, the length of time the owner has spent on the lot, property size, access to off-farm employment, and the way the property was acquired all impact the likelihood of holding secure title. While there appears to be no significant relationship between possessing secure title and participation in either STTR or APRUSAN, the owners who participate in SIRSAN are more likely to have secure title to their land, an important finding in an era of soy expansion, mechanized agriculture, and increased land values.

BACKGROUND: TITLE, SOCIAL ORGANIZATIONS, AND RURAL BRAZIL

The Importance of Secure Land Title and Mechanisms That Motivate Titling

The emergence of land rights institutions in developing countries and their effect on market expansion and economic growth, environmental protection, and poverty has been a contested subject in political, sociological, and economic literature for the last half century (Demsetz 1967; de Soto 1989; North 1990;

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Feder and Feeny 1991; Platteau 1996, Alston, Libecap, and Mueller 2000; Deininger 2003; Merry 2008). Many accounts suggest that privatized property rights emerge through an evolutionary process that begins when communal rights to land are challenged by external pressures such as market integration, increasing population density, and, in rural areas, technological advancement in farming practices (Demsetz 1967, Feder and Feeney 1991). These conditions lead to the privatization of previously communal or state-held land because, as competition over the land's resources increases, rational individuals or families seek title to their land in order to provide tenure security. Thus the desire for a system of formalized private property rights intensifies when the value of land increases and/or costs to enforcing rights to private land decreases.

Secure land tenure, in turn, can lead to important social and environmental outcomes in agricultural areas. Demsetz (1967) argues that individuals will not invest in their property if there is a high likelihood that such investments can be appropriated by others. Secure title lowers this perceived risk, and this provides incentives to invest in highly productive but costly agricultural practices (Besley 1995). Formal title also provides access to credit that is necessary for long-term investment by allowing the land to serve as collateral (Feder and Feeny 1991). Finally, the ability to invest in more costly farming practices due to increased access to credit and reduced perceived risk leads to increased agricultural productivity (Feder 1987; López and Valdés 2000; Bannerjee, Gertler, and Ghatak 2002).

Secure land tenure is also important for environmental management. Land with no clear owner is subject to degradation because no action can be taken against unknown perpetrators of environmental harm such as deforestation. Moreover, by encouraging settlement and invasion by squatters into forested areas, poorly defined land rights coupled with ineffective land reform programs can prevent sustainable land use and provide incentives for deforestation (Binswinger 1991; Alston, Libecap, and Mueller 2000). Studies in the Brazilian Amazon have shown that titled properties are much more likely to be subject to reforestation practices (Perz 2001; Summers, Browder, and Pedlowski 2004).

Together, the literature indicates that secure land title is beneficial for macroeconomic growth, individual farmers and landowners, and environmental protection.[1] Less attention, however, has been paid to the determinants of who holds title. Research has shown that human capital such as property owners' education, age, and time spent on the lot are positively correlated with holding title, suggesting that these factors provide landowners with the knowledge necessary to understand and meet the requirements of obtaining title (Alston, Libecap, and Schneider 1996; Miceli, Sirmans, and Kieyah 2001). These studies also indicate that proximity to a market or government center impacts the likelihood that the land is titled, due to increased costs of obtaining title when farther from an ad-

1. Some challenge these notions, arguing that the beneficial effects of developing formal private property rights are overstated. In some regions, traditional and informal systems can be more effective in producing positive outcomes than developing or enforcing a formal system of private land rights (Platteau 1996). Furthermore, possessing secure title does not ensure an increase in land value (Merry, Amacher, and Lima 2008).

ministrative center. Nonetheless, attention to factors that predict who has secure land rights remains limited and has rarely reflected the resources people might marshal in order to obtain title. In Brazil, this is particularly important considering the near consensus in the literature that secure land title in the Amazon is important for environmental protection and for farmers' livelihoods. Given the long history of rural organizing in the country, this article suggests that participation in voluntary associations is important for secure land title.

Social Organizing in Rural Brazil

Social organizing in rural Brazil has expanded during the last half century for a combination of social and political reasons. In 1963, a year prior to the military taking control of government, Brazil adopted the Estatuto do Trabalhador Rural (rural laborer statute). This bill sought to provide basic rights, including a minimum salary and paid days off, to rural workers (Alexander 2003). Shortly after the statute was adopted, rural labor associations from across Brazil formed the National Confederation of Laborers in Agriculture (CONTAG) as the formally recognized organization to manage, oversee, and set agenda measures for rural unions across the country. CONTAG, in combination with the rural laborer statute, set the stage for the formal incorporation of rural workers under a corporatist structure, allowing them to unionize and be recognized by the state. Rural workers' unions, such as Santarém's STTR, rapidly expanded during the military dictatorship, and by 1986, 2,800 local unions under the organization of CONTAG represented nearly ten million rural workers across Brazil (Maybury-Lewis 1994).

As civil society activity to protest the dictatorship surged in the late 1970s and early 1980s, CONTAG and the affiliated local unions—political representatives for peasants, small farmers, and rural wage laborers—became more independent and free of direct government control (Houtzager 2001). In addition, a new unionism movement emerged in response to the "old" corporatist structure that defined the dictatorship. In 1983, the movement coalesced with the forming of Central Única dos Trabalhadores (CUT), the national trade union center in Brazil. Thus, as Brazil transitioned to democracy, the rural labor movement—which included CUT, CONTAG, the rural workers' unions, and nongovernmental organizations like the Movimentos dos Trabalhadores Rurais Sem Terra (MST, Movement of the Landless)—had a strong organizational base and influential political allies (Houtzager and Kurtz 2000). By the mid-1990s, CONTAG and CUT officially affiliated with one another and have remained influential actors in supporting workers' rights.

Rural associations throughout Brazil have also impacted agricultural practices and thus environmental management. Caviglia-Harris (2003) shows that membership in unions and cooperatives in Western Amazonia increased the adoption of sustainable agriculture processes, which reduced deforestation rates. Another study in the same region shows that the presence of a farmers' association, Evangelical church, or labor union office decreased the area of land used for annual crops in favor of either pasture or perennials, which suggests an increased investment in the land (Vosti, Witcover, and Carpentier 2002, 59). This change in

land use patterns could have important consequences for forest use, particularly if landholders clear more land in favor of pasture.

THE STUDY SITE

Due to Santarém's location where the Amazon and Tapajós Rivers converge, various groups have settled there for thousands of years. Indigenous people came to the area of the Brazilian Amazon centuries ago, and village populations ranged from a few families to over five thousand (Denevan 2003). Portuguese colonizers arrived in the 1500s and developed Santarém as a trade center due to its strategic location (Reis 1979). With the introduction of European diseases, the indigenous populations drastically declined, and *caboclos* became the primary inhabitants and remain so today (WinklerPrins 2006).[2] In the twentieth century, three waves of settlement brought Brazilians from around the country: rubber tappers in the 1920s, groups from the Northeast in the 1930s, and people from areas within the Amazon in the 1960s and 1970s (VanWey, D'Antona, and Brondízio 2007).

The most recent wave of migration to Santarém was largely a secondary effect of the building of the Trans-Amazon Highway, a military-government project that sought to connect the Atlantic Ocean with Peru and create settlements for smallholder farmers who came largely from the Northeast (Bunker 1985, Barbosa 2000). Shown in figure 1 (along with other nearby municipalities), Santarém lies at the end of a major north-south road and is located at the confluence of the Tapajós and Amazon Rivers between the larger cities of Manaus to the west and Belém to the east. Despite this strategic location, Santarém was beyond the resettlement areas and not used for resource extraction like other places in the Amazon (Nugent 1993). As a result, it became a marginalized city populated by "refugees from Transamazonica resettlement schemes" who did not find the Amazon to be the place of opportunity the government claimed it to be (Nugent 1993, 93). This led to official and unofficial migration and resulted in few obtaining legal title to their land (Futemma and Brondízio 2003).[3]

Collective Organizing in Santarém

Migration into the region during this period and union expansion at the national level opened the door for collective organizing in Santarém, leading to the local formation of the two national corporatist unions, STTR in 1973 and SIRSAN in 1979. Both organizations may have been formed with close ties to the government but have since diverged in their representation and main goals. STTR's support of smallholder farmers strengthened as a result of the region's influential rural movement history during the transition to democracy. The new unionism

2. The common understanding among residents of the Brazilian Amazon is that *caboclos* are "poor, rural, non-Indian, non-recent settlers" (Chibnik 1991, 171) who are of "mixed ethnic ancestry" and are considered "deculturated Indians" (Nugent 1993, xv).

3. Squatting on private lands is not as common in Santarém as elsewhere in Amazonia. Large landowners often maintain people on their land (e.g., sharecroppers) to prevent unwanted squatting.

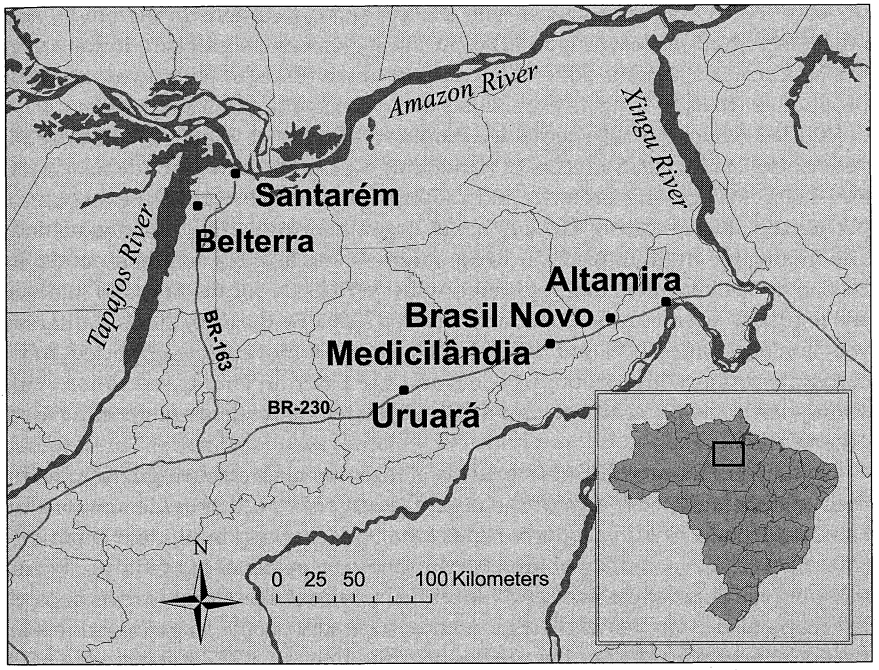

Figure 1 Santarém and surrounding cities

movement took hold in Santarém in the late 1970s when two Catholic militants formed the Corrente Sindical de Lavradores Unidos in an effort to establish local union leadership. The Corrente quickly became one of the "most influential opposition movements in Brazil," and its leaders served as key actors in CUT's national leadership (Houtzager 1997, 119). In the late 1990s, Santarém's STTR, with continued ties to CONTAG, affiliated with CUT and the Corrente and has developed partnerships with Brazilian social movements and nongovernmental organizations such as MST and Terra de Direitos in order to support its twenty thousand members (Houtzager and Kurtz 2000).[4] The union helps farmers to receive credit and administers government pension programs, and its 250 delegates hold monthly meetings with their local communities (Theis and Swette 2012).

In contrast, SIRSAN was formed as an organization to represent local elites in Santarém (Adams 2010). It advertises itself as an organization that supports landowners in a wide variety of ways, including assistance and support for legal, environmental, and land issues. According to its mission statement, SIRSAN exists for the purposes of, among other things, "study, coordination, protection, defense, and legal representation" in the agricultural arena, and upholds "social solidarity, free enterprise, the right to property, the market economy, and the interests of

4. In July 2011, the website of Santarem's STTR union, sttrsantarem.org.br, listed the organizations with which it was affiliated. The website no longer functions.

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the country."[5] Large landowners hold the leadership positions in the union, and other important landowning families in the region have significant influence in the organization (Adams 2010). SIRSAN provides a place for elites to associate in productive ways, hosting an annual fair and participating in local politics.

A third group, the Associação dos Produtores Rurais de Santarém (APRUSAN, Association of Rural Producers of Santarém), was created in 1988 (de Sá, Costa, and Tavares 2006). This organization supports producers by providing resources, promoting and educating farmers about organic farming and waste reduction, and managing an organized fair in Santarém where farmers sell their goods. In 2005, over 1,100 farmers had registered with APRUSAN for the fair, and another 500 regularly attend (de Sá Costa, and Tavares 2006). By the early 2000s, Santarém was home to both STTR and SIRSAN, the former a movement-supported, anti-corporate union with corporatist roots and the latter an elite-based union with strong ties to the government, and APRUSAN, an independent and locally based organization.

Neither STTR's nor SIRSAN's mission statements make securing land title for their members the only aim of the organizations, but both provide support for landowners to maintain property rights, and both can help individual landowners navigate the incredibly complicated process of personal land titling. While mapping the detailed political and individual stories of these processes is beyond the scope of this article, each organization supports people in getting title—or supports those who already have title—in different ways. STTR's association with the MST, an organization that fights for redistribution of land but not necessarily title for smallholders, may lead some to think that STTR will not necessarily advocate for title. However, the union's main role is "to maintain the land for the people who live there, help smallholders understand their rights, and verify their ownership of the land" (Theis and Swette 2012, 213). Thus STTR may not push for large-scale titling but instead support individual farmers as needed. It does this by serving as a source of information for smallholders, answering questions and referring them to the government agencies and people that can assist with particular issues. SIRSAN, a wealthier union, offers more formal legal services and provides financial, cultural, and political capital to its members around issues of land tenure. Furthermore, SIRSAN participates in nearly every development debate in the region, including important land titling decisions. APRUSAN does not make land titles an aim of the organization, but it is included in this study because of survey respondents' wide participation in it.

The support these organizations offer is particularly important due to the complicated nature of land tenure in the region. The titling of land near Santarém has been reported to be under the jurisdiction of the federal agency INCRA, the

5. My translation and abbreviation from SIRSAN's mission statement, which was taken from their website, www.sindicatoruraldesantarem.com.br, in July 2011: "Sindicato Rural de Santarém . . . constituído por tempo indeterminado para fins de estudo, coordenação, proteção, defesa e representação legal da categoria econômica dos ramos da lavoura, da pecuária, do extrativismo rural, pesqueiro e florestal, independente da área explorada, incluindo a agroindústria no que se refere às atividades primárias, inspirando-se na solidariedade social, na livre iniciativa, no direito de propriedade, na economia de mercado e nos interesses do país."

National Institute of Colonization and Agrarian Reform, whose office in the city of Santarém is relatively close to the surveyed properties, rather than ITERPA, the state land agency, whose office is located in the distant capital city of Belém. However, as Foweraker (2002) points out, there is confusion as to the limits of authority of each organization, particularly because ITERPA is often charged with titling properties up to one hundred hectares in size for smallholders. The problems are compounded by reports in more remote areas of the state that ITERPA is favorable to titling during election season, when titles can be given in exchange for electoral support (Alston, Libecap, and Schneider 1996). Thus the political nature of titling further complicates an already complex situation.

Increasing Demands for Title

During the large wave of settlement in the 1970s, settlers cleared large portions of forest for agricultural uses (VanWey, D'Antona, and Brondízio 2007). However, the environment is ill suited for cattle herds and the soil quality is poor, inhibiting smallholders from producing high-return crops (VanWey and Cebulko 2007). Farmers have generally grown products for consumption or small amounts of crops such as manioc for sale at local markets. The region has been economically poor with low levels of educational attainment and few employment choices outside of small-scale agriculture and service work (VanWey and Vithayathil 2013). Thus the rural population near the city of Santarém consists largely of small familial farms composed of property owners and rural workers who have limited opportunities and choices for employment on or off the farm.

However, the region has recently seen increased production of soy, a crop produced on large, mechanized farms. While smallholder farmers continued to populate much of the area in 2003 during data collection, the rise of large agribusiness was evident. In the 1990s, the national government, in an effort to expand export-based soybean sales, included the agricultural areas near Santarém in a program to use more land for soybean production (Futemma 2000). In 2003, Cargill, a large multinational agricultural company, completed and opened a deepwater port in the city of Santarém, further increasing the recognition of the region as a strategic agricultural hub.[6] These factors signal a shift from subsistence-based or small-market agriculture to mechanized, large-farm agriculture (D'Antona and VanWey 2007). An increase in soybean production clearly shows this change. In 2002, 200 hectares of land were in soy production, but in 2003, the year the survey was conducted, this expanded to 4,600 hectares and continued to grow to 11,000 hectares in 2004 and to 22,000 hectares in 2005.[7]

The rise in agricultural opportunity, particularly for outsiders speculating in land for soy production, has led to an increasingly active land market in San-

6. The Cargill port has been the focus of controversy over its potentially negative environmental impacts on the region and has closed and reopened a number of times (Dienhart 2006; Greenpeace International 2007; Theis and Swette 2012).

7. These data are accessible from the Brazilian Institute of Geography and Statistics, www.ibge.gov.br.

tarém (Moran, Brondízio, and VanWey 2005). In this climate, the possession of a title to land becomes more important because potential buyers want land security in order to access credit or resell the property in the future. In addition, once titled, farmers will invest in their land with physical, human, and financial capital (Feder 1987). Property owners are thus likely to seek land title. Therefore Santarém has seen higher rates of secure title relative to other areas in the Amazon. While we understand these aggregate-level dynamics in a wide variety of settings, the increased portion of titled properties in Santarém, coupled with the low number of migrants who obtained title upon arriving in the region, leads to enough variation in the sample to allow for a more individual-level analysis of access to title in Santarém.

This article focuses on the relationship between individuals' possession of secure title and their participation in unions, a rarely studied determinant of title. Given the historical trajectory of union formation and the importance of title, we would expect that both STTR and SIRSAN, despite their very different constituencies, would be associated with higher rates of secure title due to their corporatist histories. Both are concerned with the livelihoods of rural landowners and both have support networks that could assist landowners in obtaining title and supporting those who have title.

DATA

In order to describe who participates in social organizations and whether or not that participation pays dividends in terms of securing title, this study utilizes survey data collected in the rural region south of Santarém in 2003 by a team of collaborative researchers from UNICAMP and Indiana University. Hired interviewers who were native to the region conducted in-person interviews with property owners and heads of household on 244 familial properties. In order to equally represent properties settled since 1930, this survey utilized clustered, multistage random sampling and divided the study area by roads built at various times throughout the last century, including the federal Santarém-Cuiabá Highway (BR-163) and state highway Curuá-Una (PA-370) (Moran, Brondízio, and VanWey 2005). Figure 2 shows the four regions distinguished by these major routes of access. Surveys were conducted with household heads and their spouses in both owning and other resident households on sampled properties. Survey questions covered economic and demographic characteristics of the household, information on land ownership and type of title for the property, and land use and participation in social organizations by household members.[8]

8. This analysis includes 218 of the 244 male property owners interviewed, with 26 excluded due to missing data. Eleven properties include only a limited assessment of land use characteristics because of inability to interview the owner, so they do not include the relevant demographic or titling information. Eleven additional observations were lost due to extensive missing data throughout the questionnaire. This resulted from either a refusal to answer or because interviewers could not find a landowner after repeated visits. In some of these cases, other members of the household would respond to some but not most of the questions or did not have the information. Four questionnaires indicate the land title question is not applicable. In one of these cases, the respondent was actually a long-term renter; in another,

Analytic Strategy

I first describe the current makeup of STTR, SIRSAN, and APRUSAN before assessing the relationship between participation and secure land title. Given the history of power relations between civil society and government, we expect that the more established and wealthier farmers will participate in unions more closely tied with the government, like SIRSAN; that well-established but poorer farmers are more likely to participate in STTR due to its roots in social movements among the working poor; and that holders of medium-sized farms, whether newly arriving or more established, participate in APRUSAN, the organization that provides access to local markets. In order to measure this, I use three logistic regressions, each predicting the probability of being a member in one of the three organizations (SIRSAN, STTR, and APRUSAN). In these models, I include farmer characteristics such as wealth, how established the farmer is in the community and on the farm, available human capital, and the attention paid to agriculture. It is also important to recognize that aspects of the property—such as the distance from a market center, how the land was acquired, and the specific region where the property is located—affect the likelihood that an owner will participate in a union. Since I am primarily concerned with understanding whether or not participation in these various social organizations relates to secure land title, I use multinomial regression to estimate the type of ownership documentation the farmer possesses.

Measures of Union Participation and Title

This study examines three social organizations most common among rural households in the Santarém region: STTR, SIRSAN, and APRUSAN. Respondents were asked if they participate in any workers' unions, associations of mutual help, a producers' cooperative, and/or any other association.[9] While they could provide the name of any organization of which they were a part, these three organizations constituted the bulk of responses.[10] Although no respondents in this survey are in both STTR and SIRSAN, a few respondents do participate in both APRUSAN and STTR or SIRSAN. Table 1 shows that over one-third of the respondents in the sample (40.8 percent) participate with the widely recognized and active rural workers' union while only 16.1 percent participate in the landowners' union. Just over 20 percent of respondents participate in the local producers' association.

Respondents were also asked if they were the owner and if they had any of the following land occupation documents: property title in their name, receipt from

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the respondent was a pastor and the house belonged to the church; in a third case, the son-in-law of the owner responded and did not have the answer; and, in the last case, the respondent was a new owner who, for an unknown reason, did not answer.

9. Separate questions were asked: O senhor participa de algum sindicato de trabalhadores rurais? O senhor participa de alguma associação de ajuda mútua? Participa de alguma cooperativa de produtores? Participa de alguma outra associação?

10. Some indicated participation in a church, particularly the Catholic Church. However, I chose not to include this in the analysis because of the low number of responses and because the support provided by the church to farmers is different and outside the scope of this article.

a previous owner, a notarized document, or a possession paper.[11] They were also given the opportunity to indicate if they had other forms of documentation. I use this information to categorize documentation into three types: no documentation, some documentation, and secure title. Secure title (*título definitivo*) refers to owners who hold title in their own name or their spouse's name. "Some documentation" covers a variety of documents, such as a receipt of purchase from the previous owner, title in some other name, a notarized document, or a possession paper likely issued by INCRA during the titling process. Some owners indicated they were in the middle of the process of regularization, or *em regularização.* This means they had applied for title or the land is in dispute, but they did not yet possess a title and may not have had one of these other forms of documentation. All of these types of documents are included as "some documentation" because of the ambiguous nature of their use or unclear meanings. Table 1 shows the distribution of type of documentation. Only 15 percent of properties have no documentation, and the remaining properties are split almost evenly between possessing some documentation and possessing secure title.

Owner Characteristics

The descriptive statistics for the characteristics of the owner are displayed in table 1. These traits represent wealth, how established the owner is in the region, available human capital, the attention paid to agriculture, and the owner's place of origin. Age and time working on or taking care of the property are measured in years.[12] I create categorical measures of education, place of birth, and property size from the more detailed data originally collected.

Age, time working on or taking care of the property, and the place of origin measure the owner's establishment in the region. These statistics show a wide range of time spent working on or taking care of the property (from less than one year to sixty-three years) and a relatively high mean time (over twenty years), confirming the historical account of Santarém as a city with a relatively old settlement history yet also with new arrivals or recent land transfers. The region houses an older population of owners, with a mean age of over fifty-four years. I divide owners into four groups based on place of origin. One group, those originally from Santarém, constitute over a third of the sample and are expected to have the widest social networks and connections with the area.[13] Those from other parts of the state of Pará may know the region or the type of farming typical in the area

11. "O senhor tem: Título da propriedade em seu nome, recibo de compra dado pelo antigo dono, escritura pública, documento de posse, outro, não se aplica."

12. I use two questions to create the variable "Time working on or taking care of the property": "When did you acquire or start taking care of this property?" (Quando o senhor adquiriu ou começou a tomar conta desta propriedade?) "When did you start working on this property?" (Quando o senhor começou a trabalhar nesta propriedade?). I use the former as a measure of when the individual began making decisions regarding the property and the latter for ten observations that do not include answers for the former.

13. The survey includes respondents from Belterra, a small municipality adjacent to Santarém. Due to the proximity to the city of Santarém and the other rural areas of Santarém, I consider respondents from Belterra to be from Santarém.

Table 1 Descriptive statistics for the survey sample (N = 218)

Variable	Mean/%	S.D.	Min	Max
Title type				
No documentation	15.60			
Some documentation	44.66			
Secure title	41.74			
Social organization participation				
Workers' union (STTR)	40.83			
Landowners' union (SIRSAN)	16.06			
Producers' association (APRUSAN)	20.64			
Owner characteristics				
Time working on/taking care of property (years)	20.51	13.59	0	63
Age	54.81	12.88	23	87
Education	1.86	2.35	0	11
No education	41.74			
1–3 years	36.24			
4 or more years	22.02			
Place of origin				
Santarém	33.49			
Other place in Pará	16.06			
State of Ceará	38.07			
Other state in Brazil/other country	12.39			
Property size (hectares)	39.78	74.314	0.0512	644.869
< 10 ha	28.90			
10 to < 50 ha	51.83			
50 to < 100 ha	10.55			
100 or more ha	8.72			
Owns a vehicle (motorcycle, car, or truck)	11.47			
Off-farm employment (of at least one person)	44.50			
Property characteristics				
Time to market (minutes)	107.20	48.044	20	240
How property was acquired				
Purchased	65.60			
Received from government program	6.42			
Inherited	18.35			
Other means	9.63			
Study area region				
1 (farthest west)	17.43			
2 (center west)	29.36			
3 (center east)	19.27			
4 (farthest east)	33.94			

but may not have the historical ties to the specific area. This group represents 16 percent of respondents. A third group, 38 percent of respondents, come from the Northeast state of Ceará. Last, 12 percent originate from other regions within Brazil.[14]

14. Besides Pará and Ceará, respondents come from nine other states: Alagoas, Amazonas, Espírito Santo, Maranhão, Minas Gerais, Mato Grosso, Piauí, Rio Grande do Norte, and Rio Grande do Sul.

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Table 2 Distribution of properties by size (N = 218)

	Properties		*Area*	
Group	Number	%	Hectares	%
< 10 ha	63	28.90	217.02	2.50
10 to < 50 ha	113	51.83	2,826.59	32.59
50 to < 100 ha	23	10.55	1,513.59	17.45
> 100 ha	19	8.72	4,116.46	47.46
Total	218	100.00	8,673.66	100.00

Levels of human capital, measured by educational attainment, are low in rural Santarém. Nearly 42 percent of the sample reported no formal education, and about 78 percent have three or fewer years. Only three people indicated eleven years of education, the maximum reported by anyone, and only nine said they had six years or more. Due to the nonlinear nature of education, I treat it as a categorical variable in this analysis and differentiate three distinct levels: no education, one to three years (little but enough to be literate), and four or more years.[15]

I use the size of the property and ownership of a vehicle as measures of wealth. While property size is measured in hectares in the survey, I categorize property size into four groups to capture scale differences in activities possible on the property. Owners whose properties are smaller than ten hectares have little opportunity to sell agricultural products and often cannot subsist solely on what they produce. Those with at least ten hectares but fewer than fifty have more options regarding what they can produce, and they can, at times, have enough to sell a small portion of goods at market. I include a group whose properties are less than one hundred hectares but at least fifty because, while these owners are unlikely to be major agricultural producers, they have a significant amount of land to cultivate a variety of crops for subsistence and/or sale. In this region, where smaller farms make up the majority of properties, those over one hundred hectares are considered to be quite large and owners have many more land use options. Thus I group these properties together as the largest category. Table 2 displays the distribution of properties by size and includes the percentage of total properties as well as the percentage of total area for each group. It indicates an unequal distribution of land. While over 28 percent of the total properties are smaller than ten hectares, these make up only 2.5 percent of the total area. Conversely, the largest properties of over one hundred hectares total less than 10 percent of properties but make up nearly half of the area.

Owning a vehicle greatly improves opportunities for selling products produced on the farm and allows access to the city and other places in the region;

15. Although primary education in Brazil includes grades one through eight and secondary education grades nine through eleven, few in my sample receive more than four years of education (23 percent). I include ten owners with missing information to keep these observations in the overall analysis. Due to the small number, I group them with no education in the analyses.

it thus serves as another good measure of wealth. Households were asked how many motorcycles, cars, and trucks they own. I treat vehicle ownership as a dichotomous variable. If any household on the property reported owning at least one vehicle, I consider the property owner to have a vehicle. Less than 12 percent of the sample owns a vehicle.

Off-farm employment indicates diversified sources of income so that owners do not need to rely solely on farming. The financial capital that off-farm employment provides can be utilized to increase farming efficiency through the use of technology, and these farmers may not need the social supports provided by a social organization that focuses attention on farming support. If anyone who lives on the property works off the farm, I consider the property to have off-farm employment; under half (44.5 percent) fit this description.

Property Characteristics

In order to demonstrate how features other than individual traits impact the likelihood of an owner participating in a social organization and possessing secure title, Table 1 also shows descriptive statistics regarding property characteristics. I consider three characteristics of the property: distance from a market center (in this case Santarém), how the property was acquired, and the specific region within the study area. I use self-reported travel time to the city of Santarém rather than a strict distance measurement because of the varied terrain and transportation methods that result in wide variation in travel time for similar distances.[16] The mean travel time to Santarém is just over 100 minutes, but it varies widely between 20 and 240 minutes.

Santarém's long history of migration and settlement and high rates of turnover are reflected in how the property was acquired (D'Antona, VanWey, and Hayashi 2006). A large proportion of owners purchased their property (65.6 percent), a moderate number inherited the land (18.3 percent), and a much smaller group (6.4 percent) received their land through government agencies such as INCRA. The remaining 9.6 percent acquired the land through other means such as marriage, occupation, or donation.

Last, I divide the properties by region within the study area (based on the sample design described above and shown in figure 2). These regions have distinct accessibility, varied terrain and soil quality, and differing political histories. The region farthest to the west consists of the properties along and near the federal Santarém-Cuiabá Highway (BR-163) and has poor soil quality but is easily accessible, making it a target for soybean cultivation. The region farthest to the east, delimited by the paved state highway Curuá-Una (PA-370), is also relatively accessible, has more varied crop production and some cattle grazing, and extends off the plateau and into the floodplains. The middle two regions, which can be difficult to reach due to poor road conditions, particularly during the rainy sea-

16. For five respondents who did not answer the question, I impute the value based on travel time for the nearest property with complete data. I also imputed the travel times to Santarém for one owner who reported travel time to Belterra for consistency within the sample.

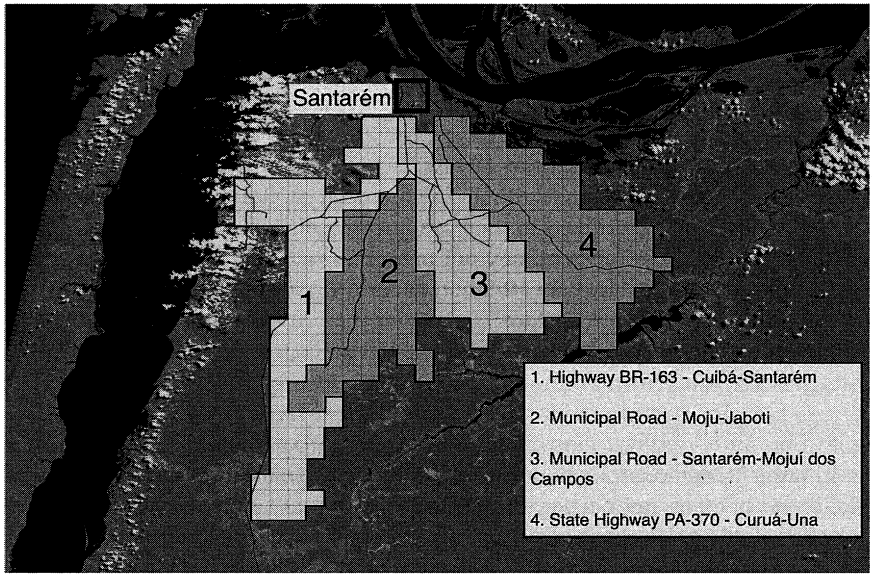

Figure 2 Sampling regions in Santarém (adapted with permission from D'Antona and VanWey 2007)

son, were settled in the 1950s by people from the Northeast of Brazil who produce manioc, flour, fruit, and eggs.

RESULTS

Describing Participation in Rural Social Organizations

Table 3 displays the results of the logit regressions predicting the probability of participation in each of the three organizations analyzed. People who are more established in the area, older, and of local origin are more likely to participate in STTR, the workers' union. Those from other parts of Pará are less likely to participate in STTR relative to those who are from Santarém. The measures of how established in the area an owner is show no significant results for predicting the probability that an owner participates in SIRSAN, the landowners' union. Results are mixed for APRUSAN participation. Less-established individuals, as indicated by younger age, are more likely to participate in this producers' association than those who are older. However, owners from anywhere outside of Santarém are less likely to participate than those from the town. Thus younger owners from Santarém have the highest probability of participating in APRUSAN.

Wealth, as measured by land size, also plays a role in who participates in which organizations. Those owning the largest properties have a lower probability of participating in STTR than those owning the smallest properties, while the opposite is true for predicting APRUSAN participation. The wealthiest owners,

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Table 3 Logit regressions for variables predicting participation in social organizations

Variables	STTR (workers' union)		SIRSAN (landowners' union)		APRUSAN (producers' association)	
Owner characteristics						
Time working on property (years)	0.0089	(0.014)	0.0069	(0.018)	−0.0024	(0.019)
Age	0.0335**	(0.014)	0.0108	(0.018)	−0.0599***	(0.019)
Education (Ref: 0 years)						
1–3 years	0.2278	(0.354)	−0.0008	(0.459)	−0.1164	(0.489)
4 or more years	−0.0337	(0.469)	0.0208	(0.593)	−0.1758	(0.575)
Place of origin (Ref: Santarém)						
Pará	−1.2350**	(0.502)	0.5329	(0.583)	−1.2965*	(0.669)
Ceará	−0.1662	(0.403)	0.3390	(0.541)	−0.9172*	(0.527)
Elsewhere	−0.3383	(0.531)	0.1732	(0.705)	−1.6013**	(0.718)
Property size (Ref: < 10 ha)						
10 to < 50 ha	−0.2462	(0.358)	0.9742*	(0.518)	0.1706	(0.487)
50 to < 100 ha	−0.3987	(0.570)	−0.3078	(0.909)	0.3707	(0.738)
100 or more ha	−1.6016**	(0.695)	−0.0570	(0.945)	1.6545**	(0.836)
Vehicle ownership	−0.1337	(0.516)	−0.5290	(0.706)	−0.3653	(0.635)
Off-farm employment	−0.5839*	(0.321)	−0.5512	(0.424)	−0.3521	(0.436)
Property characteristics						
Time to market (Santarém)	0.0002	(0.003)	0.0003	(0.004)	−0.0092*	(0.005)
How property acquired (Ref: purchased)						
Received from INCRA	0.0143	(0.665)	−0.1644	(0.755)	−1.4154	(1.137)
Inherited	0.2527	(0.442)	−0.6117	(0.636)	−2.4658***	(0.806)
Other	0.2669	(0.524)	−0.7052	(0.815)	0.1985	(0.624)
Study region (Ref:4)						
Region 3 (center-east)	0.0133	(0.450)	−0.0671	(0.591)	0.1603	(0.535)
Region 2 (center-west)	0.4297	(0.408)	0.0726	(0.528)	−0.9704	(0.604)
Region 1 (west)	−0.2760	(0.469)	0.0285	(0.598)	0.6607	(0.586)
Constant	−1.8148*	(0.951)	−2.8399**	(1.280)	3.8784***	(1.292)
Observations	218		218		218	
Pseudo R-squared	0.101		0.0756		0.231	

Note: Standard errors in parentheses.
***p < .01; **p < .05; *p < .10.

as measured by property size, are much more likely than the least wealthy to be in this producers' association. SIRSAN appears to attract owners with medium-sized properties (ten to fifty hectares). Thus the wealthiest property owners have the highest probability of participating in APRUSAN, those with a little more wealth than the poorest are more likely to be in SIRSAN, and the poorest are most likely to be in STTR.

Across all three organizations, it appears that vehicle ownership and off-farm employment lead to less participation. However, the only significant results show

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that properties with at least one person working off the farm are less likely to participate in STTR than those with nobody working off the farm.

Property characteristics have little explanatory power in this analysis but indicate two expected results. One, owners of properties farther from Santarém are less likely to participate in APRUSAN, and two, owners who inherited their properties have a much lower probability of participation in APRUSAN than those who purchased their properties. In sum, while this analysis does not provide much information regarding SIRSAN participants, these results indicate that young, wealthy owners from Santarém are most likely to participate in APRUSAN, and more established, poorer property owners from Santarém have a higher probability of participating in STTR.

Determinants of Land Security

Table 4 shows the relationships between property and owner characteristics, including participation in each of the three unions and the probability of having secure title, some documentation, or no documentation. Controlling for all of the variables in the model describing participation in the unions, this model shows that participants in SIRSAN, the corporatist landowners' union, are much more likely to have secure title than some or no documentation. This analysis also shows that more established owners—as indicated by time spent working on or taking care of the property, age, and place of origin—are more likely to have secure title. Older owners and those from Santarém are more likely to have secure title than those who are younger or from the municipality. Wealth, as indicated by property size, is also related to possessing title. Wealthier owners, or those with larger properties, have a higher probability of holding title than the poorest, or those with small plots of land. Owners of properties in which at least one person works off the farm (a measure of access to diversified sources of income) are less likely to possess title. Owners who inherited their properties are far less likely to hold title than those who purchased the property, and the regions in the west of the study region are less likely to have secure title than those in the eastern region.

DISCUSSION: DIFFERENCES AMONG SOCIAL ORGANIZATIONS

The results highlight that wealthy owners from Santarém are most likely to participate in APRUSAN, and more established, poorer property owners from Santarém have a higher probability of participating in STTR. The results reflect some of the major historical differences between the three organizations. While STTR was formed as a union for workers, both APRSUAN and SIRSAN have, since their inception, targeted farm owners and agricultural producers. Thus we expect to find the differences between STTR and the other two organizations that appear in this analysis. The findings that the wealthiest owners and those with access to off-farm employment are the least likely to participate in STTR reflect STTR's historical attention to poor workers and smallholder farmers.

Although both SIRSAN and APRUSAN have, since their formation, attracted farm owners and producers, these findings reflect two major differences between

Table 4 Multinomial logit regressions predicting documentation type

Variables	Some vs. none		Secure vs. none		Secure vs. some	
Owner characteristics						
Years working on property	−0.0224	(0.021)	0.0126	(0.022)	0.0350**	(0.017)
Age	0.0335	(0.023)	0.0546**	(0.025)	0.0211	(0.017)
Education (Ref: 0 years)						
1–3 years	0.688	(0.531)	0.444	(0.589)	−0.245	(0.427)
4 or more years	1.530**	(0.741)	1.329	(0.824)	−0.202	(0.547)
Place of origin (Ref: Santarém)						
Pará	−0.909	(0.724)	−1.192	(0.800)	−0.284	(0.580)
Ceará	−0.634	(0.651)	−1.482**	(0.717)	−0.849*	(0.500)
Elsewhere	−1.177	(0.784)	−2.203**	(0.887)	−1.027	(0.631)
Property size (Ref < 10ha)						
10 to < 50 ha	1.279**	(0.518)	2.025***	(0.604)	0.746	(0.464)
50 to < 100 ha	2.114	(1.286)	4.090***	(1.335)	1.976***	(0.708)
100 or more ha	−0.165	(1.092)	2.243**	(1.089)	2.408***	(0.842)
Vehicle ownership	−0.136	(0.845)	−0.351	(0.866)	−0.216	(0.565)
Off-farm employment	−0.903*	(0.500)	−1.388**	(0.547)	−0.485	(0.386)
Property characteristics						
Time to market (Santarém)	0.00416	(0.005)	0.00548	(0.006)	0.00132	(0.004)
How property was acquired (Ref: purchased)						
Received from INCRA	0.715	(1.271)	0.977	(1.331)	0.263	(0.790)
Inherited	−0.192	(0.652)	−1.294*	(0.737)	−1.102**	(0.538)
Other	−1.091*	(0.652)	−1.855**	(0.798)	−0.763	(0.669)
Study region (Ref: 4)						
Region 3 (center east)	−0.244	(0.653)	−1.076	(0.719)	−0.832	(0.539)
Region 2 (center west)	0.377	(0.678)	−0.764	(0.735)	−1.141**	(0.489)
Region 1 (west)	−0.753	(0.727)	−1.854**	(0.796)	−1.101**	(0.557)
STTR	−0.322	(0.551)	0.131	(0.607)	0.453	(0.430)
SIRSAN	0.255	(0.891)	1.697*	(0.915)	1.442***	(0.549)
APRUSAN	0.0699	(0.632)	0.779	(0.689)	0.709	(0.493)
Constant	−0.526	(1.463)	−2.304	(1.667)	−1.779	(1.228)
Observations	218		218		218	

Note: Standard errors in parentheses.
***p < .01; **p < .05; *p < 0.1.

the two organizations. First, given that SIRSAN was formed on a national level in the early 1960s and in Santarém ten years later, nearly a full decade prior to APRUSAN, it makes sense that older owners are more likely to participate in SIRSAN while younger owners have a higher probability of participating in APRUSAN. Likewise, APRUSAN's attention to providing access to market space where producers can sell their goods may make this organization more attractive to younger owners than organizations involved in social movements or offering technical and legal assistance.

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Most important to the central ideas of this article, the results show systematic variation in who has secure title. The positive correlation between land security and human capital variables including the amount of time on the property, age, and education is to be expected based on previous research and theory. This correlation could indicate, as Alston, Libecap, and Schneider (1996) argue, that people with more experience and education understand what is required to obtain title. It could also reflect, particularly in regard to time on the property and age, the long waiting time to receive a title. Similarly, the strong positive correlation between wealth, as measured by property size, and more secure tenure is not surprising. However, it is difficult to distinguish whether wealth leads people to have title or whether secure tenure brings greater investment and more wealth over time. The result that properties with diversified income, as measured by off-farm employment, are less likely to have secure title could indicate a risk management strategy. It is possible that families who lack tenure security make a rational decision to have diversified income due to possible eviction or lack of credit to invest in more profitable farming practices.

The lower likelihood of title for properties that were not purchased or received from INCRA indicates that holders of properties that have not exchanged ownership through formal mechanisms may not have incentives or the need to acquire title. This result also suggests that title is important for selling properties through more formal channels, as those who received land this way are more likely to have title. Although most of these results corroborate existing theory, it is noteworthy that the time to market does not seem to have an effect on title possession. This is likely because most properties are relatively close to the city, so the distance to administrative centers is not a significant deterrent.

There are two possible explanations for why we observe that owners in SIRSAN are more likely to have secure title, even when accounting for wealth. First, this may reflect its historical formation as a corporatist union. We can expect that corporatist unions, with their historically strong ties to the government, have access to scarce resources that are governed by the state, such as title. Other organizations, like APRUSAN, do not have such direct ties and therefore provide different services. The result that those who participate in STTR are not more likely to have title is not surprising due to the union's severed ties to its corporatist roots and its history as a social movement fighting against many government policies.

An alternative explanation is that landowners who already have titles will be attracted to SIRSAN for the legal and social support that the organization can offer to those with title. This is particularly noteworthy considering the results predicting participation in SIRSAN. We might expect that this union, considered to be an organization for local elites, would attract wealthy landowners. However, none of the wealth measurements in the statistical model, including land size, vehicle ownership, and off-farm employment, are associated with a higher likelihood of participation in SIRSAN. People may seek the services that the organization provides for those with title. In sum, this analysis shows relationships between holding title and participation in particular social organizations. These relationships may be due to the particular historical trajectory of different unions and to the services offered by SIRSAN for those likely to hold title.

CONCLUDING REMARKS

An extensive literature on the importance of secure land rights suggests that land title is important for the sale of land, for acquiring credit that enables investment in costly yet profitable farming practices, and for supporting sustainable environmental management. This article examines the determinants of land title possession and confirms existing theory that those with more human capital and wealth are more likely to hold title. It contributes to our understanding of property rights by showing systematic variation in whether people have title based on participation in specific rural unions. This study does not suggest a particular causal direction between factors correlating with land title and possession of title itself but argues that these correlations are important in an era of increased large-scale farming, mechanization of agriculture, soy expansion, and rising land prices. As the value of land increases and title is seen as necessary for sale or investment, the importance of secure land rights in the form of title only intensifies for rural landowners. Whether or not particular unions support their members in obtaining title, landowners who hold title and the organizations in which they participate will benefit from rising land prices and will likely gain wealth and power relative to others.

This article suggests that research on rural civil society and livelihoods of both smallholders and larger-scale farmers can benefit from taking into account the relationship between participation in voluntary associations and secure land title. Close examinations of how farmers navigate the bureaucratic and political system of land titling provide insight into how these organizations impact household decision-making processes. Finally, these results have implications for environmental studies, particularly in rural Brazil, where deforestation is a central concern. The literature widely agrees that secure land title has positive effects for the sustainable management of the environment, and some accounts show that voluntary associations play a role in land use patterns. This study suggests that future research on forest and natural resource management should investigate the complex and interdependent relationships between participation in rural organizations, land title, and land use decisions, which together directly impact the environment.

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