

PROPERTY RIGHTS AND LAND USE IN THE BRAZILIAN AMAZON:
LESSONS FROM U.S. ECONOMIC HISTORY

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U.S. land policy in the nineteenth and early twentieth centuries encouraged the rapid transfer of property rights to land from the Federal Government to private claimants. A variety of methods were used, including cash sales, homesteading (under the Homestead Act of 1862), and recognition of squatter claims (under the Preemption Acts). Further, land was granted by the government to support infrastructure development through land grants to canal companies and railroads, local schools, and agricultural colleges. By 1890, some 1.2 billion acres of land were transferred to private individuals/ mostly smallholders. The transfer for the most part was smooth and accompanied by little violence. Security to land was granted quickly and this no doubt contributed to the incredible increase in agricultural output and productivity enjoyed by the U.S. over the period.

Secure property rights to land in the United States provided the necessary conditions for optimal land use decisions, but these institutions did not rule out rapid harvest or nutrient mining of the soil, which were determined by the path of expected prices. In both the U.S. South prior to the Civil War and in the Great Lakes states in the late nineteenth century, there is evidence of nutrient mining and rapid harvest. In the South, cotton planters appear not to have invested in fertilizers so long as the frontier was expanding and land prices were expected to remain low. Similarly, in the Great Lakes states, there was rapid harvest of the white pine forests in anticipation of the arrival of new forest

stocks, as railroad connections to the Pacific Northwest were completed. As frontier expansion slowed, land and product prices began to rise, and with them, investments were made in the land and harvest rates were slowed.

Brazil shares many of the characteristics of the nineteenth-century United States. It has large amounts of frontier land, owned by the Federal Government, which are open to private claiming and settlement. AS in the U.S., individuals have been migrating from settled regions to the frontier in search of higher living standards. Indeed, through this process, much of southern Brazil has been occupied and the lands placed into agricultural production. Now, attention is directed to the Amazon. Apparent rapid harvest of the rain forest and farming that depletes soil quality, however, have raised concerns about the efficacy of the settlement process in the Amazon.

The U.S. experience makes clear that both insecure property rights and the anticipated path of prices could lead to observed harvest and investment practices. We are in the process of examining tenure and land use conditions in the Amazon state of Para and comparing them to the U.S. historical experience. Our preliminary analysis indicates that both factors are operating in Brazil. The tenuring process is slow and confused, leading to short-time horizons and uncertainty. Before 1964, state governments had constitutional authority to transfer public lands to private claimants. After the military revolution, the Federal Government sought to increase its authority over the public domain, culminating in 1971 with Decree Law 1164, which claimed for the Federal Government, jurisdiction over 100 kilometers on both sides of all federal roads and along foreign borders. Much of the land in the Amazon was affected. A federal agency, the Instituto Nacional de Colonizacao di Reforma Agraria, INCRA, was placed in charge of the public lands claimed by the Federal Government, much like the General Land Office in the United States. Additionally, plans for infrastructure development were put into place, including the construction of new roads, planned towns, schools, medical facilities, and so forth. Unfortunately, the process has not proceeded smoothly. First, the Federal Government's claims have been challenged by the states, and state land agencies have continued to promote private settlement on federal lands. In Para, the Instituto de Terras do Para, ITERPA, has competed with INCRA. Currently, the new constitution has returned settlement to the state agencies, but INCRA remains in business. INCRA and ITERPA, however, appear to have assigned title very slowly. In all of this confusion, conflicting titles have been granted, violence has resulted in some areas, settlement has been allowed without proper surveying, and recording of claims has been haphazard. Further, even where title has been granted, in some cases holdings remain vulnerable to invasion by squatters. This is particularly true for large, forested tracts. Under Brazilian law, individuals can claim private and public land through squatters' rights or posse and receive title if they occupy and improve the land. This is similar to U.S. preemption practices, except that in the United States,

squatters could not occupy private land. In Brazil, the criteria for squatters vary between the Federal Government and the states, and enforcement of property rights for both existing owners and squatters appears arbitrary and localized. Nevertheless, as with U.S. common law for western water rights, the land must be placed into productive use if title is to be retained. This discourages the holding of forest land for future harvest or other purposes. Moreover, boundaries of forested land are difficult to police, encouraging squatter invasion. Accordingly, individuals have incentives to clear in order to monitor the boundaries of their land claims.

The insecurity over property rights in frontier regions of the Amazon, raises transactions costs, increases uncertainty, and shortens time horizons. All of these encourage rapid harvest and wasteful land use practices. The expected path of land and timber prices also appear to play a role. Vast tracts of frontier land remain to be claimed. Hence, land is cheap, and investment in it is discouraged. Additionally, with huge stocks of remaining forest, timber prices are low and expected to remain so. Compared to cattle raising or agriculture, forestry seems not to be an economically-viable option.

In order to examine tenure conditions and land use practices in the Amazon, we have conducted field surveys in three sites in the state of Para: Tucuma, Altamira, and Paragominas. The three sites vary with respect to their position along the frontier, and hence, in terms of inherent land rent. Paragominas is the closest to major highways and large market centers. Altamira is the most remote. Altamira and Paragominas settlement has been administered by INCRA, while Tucuma was largely settled by a private company. Within the regions, soil characteristics are fairly homogeneous. We have collected the following farm level data to use in an analysis of the impact of tenure security on land use: 1) whether the occupant has secure title; a license to occupy; a sales receipt from a previous squatter, but no title; or is a squatter; 2) whether the individual has made land-specific investments, such as fences, fertilizers, pesticides, or corrals; 3) hectares planted in permanent or temporary crops; 4) distance to local and major markets; 5) year of arrival in the area; 6) education; 7) number of family members; 8) number of past migrations; 9) age; and 10) the claimant's estimate of land values with and without title. We are surveying both small holders and large ranchers.

With these data we have performed preliminary tests on the determinants of investment, the planting of permanent crops, and the price of land. In all regions, titled land is associated with greater land-specific investments, controlling for the inherent land-rental stream (soil characteristics, distance to markets) human capital of the farmer and family size. Secure title also raises land prices, controlling for other factors. Finally, with respect to permanent crops, title also influences crop choice in the two less-remote sites of Paragominas and Tucuma, but not in Altamira. We are currently refining these tests, incorporating

institutional information on the titling process, gathering land and product price data, and surveying large holders. With this information we will be able to better compare the process by which property rights to frontier land were granted in the U.S. and Brazil and analyze the role played by factor and product prices. This is the first time that an in depth analysis of property rights to land has been made in the Brazilian Amazon or that a comparison has been made with the historical U.S. experience. The paper outlines U.S. land policies and their impact on property rights. Land use and harvest practices are described for the U.S. South and the Great Lakes States as frontier conditions changed. These patterns are compared with tenure practices, settlement conditions, and land use practices in the Brazilian Amazon.