

22. Property Rights and the State

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1. INTRODUCTION

Property rights determine the incentives for resource use. Property rights consist of the set of formal and informal rights to use and transfer resources. Property rights range from open access to a fully specified set of private rights. By open access we mean that anyone can use the asset regardless of how their use affects the use of others. A full set of private rights consists of the following: 1) the right to use the asset in any manner that the user wishes, generally with the *caveat* that such use does not interfere with someone else's property right; 2) the right to exclude others from the use of the same asset; 3) the right to derive income from the asset; 4) the right to sell the asset; and 5) the right to bequeath the asset to someone of your choice. In between open access and private property rights are a host of commons arrangements. Commons arrangements differ from open access in several respects. Under a commons arrangement only a select group is allowed access to the asset and the use rights of individuals using the asset may be circumscribed. For example, a societal group, e.g., a village, tribe or homeowner's association, may allow its members to place cattle in a common pasture but limit the number of cattle that any member may put on the commons.

One role of the state is to define, interpret and enforce property rights. Definition of property rights is a legislative function of the state. Interpretation of property rights is a judicial function of the state. Enforcement of property rights is a police function of the state. All three functions entail costs and for this reason some rights may be left by the state as open access. Moreover, many assets have multiple dimensions and it is costly for the state to define property rights over all valuable dimensions and costly for the state to enforce property rights over all dimensions. As such, some attributes may be either *de jure* or *de facto* left as open access. Individuals and groups have incentives to expropriate the use rights over attributes that the state leaves as open access.

In many situations individuals or groups use violence as a strategy to capture property rights. From the vantage point of societies, violence is wasteful and can be a motivating force for the state to enforce property rights. Violence or threats of violence may also result when the state attempts to redistribute property rights.

In Sections 2 and 3 we briefly discuss the role that property rights play in resource use and provide some background on the determinants of property rights. In Sections 4 and 5 we develop an analytical framework for understanding the evolution of property rights, with special emphasis on the difficulties in changing property rights. In Section 6 we explore the development of property rights in the Brazilian Amazon through the lens of our analytical framework. In Section 7 we present some concluding remarks.

2. THE ROLE OF PROPERTY RIGHTS

Property rights matter because they determine resource use. The more exclusive are property rights to the individual or group the greater the incentive to maintain the value of the asset. Furthermore, more exclusive rights increase the incentive to improve the value of the asset by investment, e.g. in the case of land this may entail the removal of rocks and stumps or using fertilizers. Having the incentive to invest may not be sufficient to induce investment if individuals or groups are “cash poor.” In this situation, the ability to invest is aided if assets can be used as collateral to secure a loan. In developed countries land has served as collateral for centuries. Unfortunately, in many parts of the world mortgage markets are not well-developed and investment suffers.

Allowing sales as a property right may improve resource allocation in two ways: 1) allowing sales help signal scarcity value; and 2) markets enable those who value the asset most the ability to purchase the asset. Of course we need to be careful to note that by value economists include the ability to pay which historically and today is limited by the degree of development of mortgage markets.

To be meaningful, property rights need to be enforced. One of the critical roles of the state is to enforce property rights. Enforcement by the state typically lowers self-enforcement costs which raises the value of the asset directly but also via the incentive for increased investment. A further impact of state enforcement is that asset holders can reallocate their labor from defending their asset to household or market production.¹

3. THE DETERMINANTS OF PROPERTY RIGHTS: SOME BACKGROUND

So far we have discussed the role of property rights in a static world. But, over time several factors affect the scarcity of resources. Scholars studying property rights have typically looked at cases where changes in technology, population, or preferences alter scarcity value. When resources become more or less scarce, the current property rights regime may entail dissipation of the rental stream

¹Field (2003) found that the largest gains from titling projects in urban Peru came from increased labor force participation.

from the asset. The losses that ensue create incentives for those involved to change the property rights to a form more suited to the new reality. The abilities of individuals, groups and states to alter property rights in response to changes in scarcity go a long way towards explaining the economic growth and decline of nations. This is what Douglass North would describe as “adaptive efficiency.”

By examining how property rights change in response to the exogenous factors of technology, population and preferences scholars have derived insights for a theory of the emergence of property rights and, more broadly, institutional change and economic growth. The literature is voluminous and we can at best present some illustrative cases. Demsetz (1967) pioneered the empirical study of endogenous property rights development with his work on the introduction of property rights among Native Americans in eastern Canada. Demsetz argued that greater specificity and enforcement of property rights emerge in response to greater scarcity. Anderson and Hill (1975); Dennen (1976); Umbeck (1981) and Libecap (1978) followed in the wake of Demsetz with studies on the emergence of property rights to resource use in the U.S. West.²

Scholars have also analyzed contemporary cases of the evolution of property rights. Alston, Libecap and Mueller (1997, 1999a, 1999b, 2000) analyzed the evolution and effects of property rights in the Brazilian Amazon; Ensiminger (1995) examined property rights arrangements in Kenya; Besley (1995) looked at the impact of property rights on land use in Ghana; Feder and Feeny, (1991) examined property rights to land in Thailand and Migot-Adholla et.al. (1991) studied the impact of property rights in Sub-Saharan Africa. The property rights approach has also been used to understand markets besides those for land and natural resources, e.g. Coase (1959) examined the broadcast spectrum and Mueller (2002) analyzed the property rights arrangements over Internet domain names.

Heuristically, we can use the demand and supply framework to structure the analysis of the variation in property rights (Alston, Eggertsson, and North, 1996).³ Demand forces include the various winners and losers associated with either the status quo set of property rights or some potential set of property rights. Supply forces include the incentives that political actors face given the political institutions in place, e.g. the institutional outcome may vary by whether the political system in place is Presidential, Parliamentary or Dictatorial. In some cases the change in property rights will be endogenous to the system but exogenous to individual actors on either the demand or supply side. For example, under certain situations, the heads of governments may be forced to “do something” in response to a certain natural disaster such as a flood or hurricane. If any conceivable head of state would act in the same manner we maintain that the change was exogenous to them. Alternatively, there are situations when either or both the demanders and the suppliers will be able to

²For more recent contributions to the literature on property rights see Anderson and McChesney (2003) in a special issue of the *Journal of Legal Studies* (June 2002).

³We say “heuristically” because the set of property rights may have multiple equilibria.

directly affect the change. For example, if a President has strong veto power, he may be in a position to maintain the status quo.

In this essay we present a framework for the determinants of the emergence and evolution of property rights. We start with the proposition that some actors must perceive that they can benefit from a change in the status quo set of property rights. Or as put by Demsetz (1967) “property rights arise when it becomes economic for those affected by externalities to internalize benefits and costs.” The Demsetz view of property rights has been termed by Eggertsson (1990) as the naïve view of property rights.⁴

We stress that to understand the evolution of property rights it is necessary to carefully examine the interplay between “demanders” and “suppliers.” History is replete with examples of conditions where the potential net gains from a change in property rights is not sufficient to prompt change because the costs of making all the appropriate side payments to parties with veto power dissipate the potential gains. The ubiquities of poor economic performances of economies throughout history and in the present suggest that such outcomes are common.

Our purpose is to analyze how a country’s institutions determine how property rights evolve and whether this outcome will come about through cooperation, conflict or intermediation by the State. Together with non-institutional factors such as the homogeneity of the population and relative endowments, institutions determine which groups have the ability to block change and whether it is possible to “buy out” the political gatekeepers through side-payments. In the same manner institutions can facilitate cooperation by providing low cost means to make credible commitments.

4. THE DEMAND FOR PROPERTY RIGHTS

In this section we present a framework for analyzing how the demand for property rights arises and may lead to the evolution of property rights. Alston, Libecap and Schneider (1996) developed this general framework to analyze the demand for property rights security over land in the Brazilian Amazon. Underlying the analysis is the notion that the potential rent generation from more secure property rights increases as the resource becomes scarcer. The difference between the rental streams from an asset with more as compared to less secure property rights generates a “demand” for secure property rights. In Figure 1 the horizontal axis measures the relative scarcity of a given resource (from right to left) and the vertical axis measures the net present value that accrues to the owner of that resource. Line AH shows that the net present value of the resource increases as it becomes scarcer. In the case of land the measure of scarcity could be the distance of a plot of land to a market center, as transportation costs are often the main determinant of land value.

⁴Eggertsson (1990:250) called this view the “naïve” theory of property rights because it ignores social and political institutions through which demands are filtered.

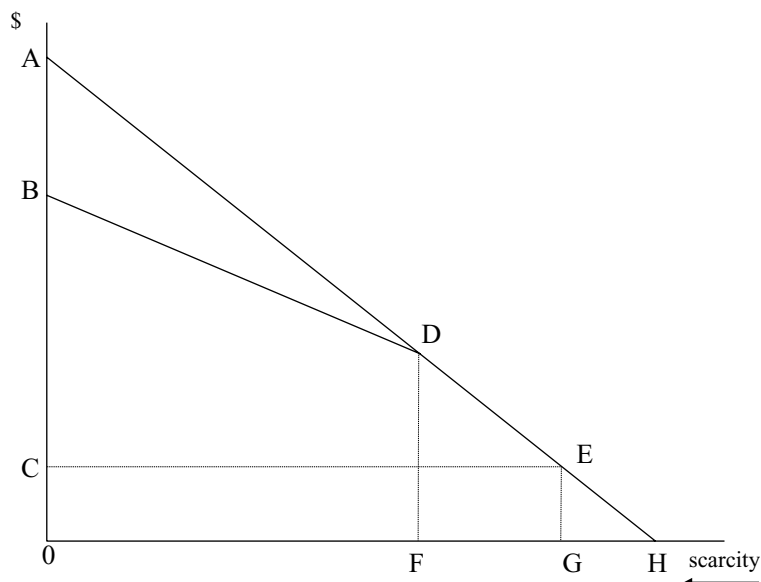


Figure 1. The demand for and evolution of property rights.

At point H land is so far from the market center that the economic return given the transportation costs to market is zero. The segment BDEH represents the net present value of land under a commons arrangement.⁵ OC represents the opportunity cost of the marginal laborer. As such, point G represents the economic frontier where, provided costs of migration are low, it becomes worthwhile for labor to migrate to the frontier. In our model distance is the frontier but it could be technological, for example broadcasting on previously unused frequencies at the spectrum frontier.

At points between G and F property rights are not formally defined or enforced, but this does not affect the return to the resource given that it is still abundant relative to the competition for it. As the net present value increases new users arrive yet they are able to get access to the resource without detracting much from the use of those who were already there. At this stage resource users will tend to be relatively homogenous and informal property rights arise that are sufficient to arbitrate the existing competition. Any potential disputes are easily defused as accommodation yields higher expected returns than confrontation. Squatting prevails yet absence of government-enforced private property rights does not pose significant costs.⁶ Note that the emergence of informal property rights at this point is already a case of institutional change.

⁵ We could further segment line DE into the return from a commons versus open access arrangement. The losses from an open access arrangement would increase as one moves towards greater scarcity.

⁶ An example of informal arrangements includes Cattlemen's associations in the 19th century U.S. West (Dennen, 1976). See Anderson and Hill (2002); Eggertsson (1990); Ostrom (1990) and Umbeck (1981) for accounts of local groups allocating resources under "common" arrangements. See Smith (2000) for an analysis of "semi-commons" arrangements.

At points to the left of F the returns to the resource have risen and start attracting an ever-growing number of individuals. This new migration typically brings heterogeneous individuals with differing amounts of wealth or human capital, nationalities, cultures, or objectives. The informal institutions that developed can no longer cope with the increased competition for the resource. It becomes necessary to expend effort, time and money to assure continued possession of the resource and the income derived from it. This may involve incurring costs to exclude others or the cost from sub-optimal uses. It may also include the costs to lobbying for changes from informal to formal property rights. At some point it becomes beneficial in the aggregate to have officially defined and enforced property rights. The pie-shaped area ABD represents the increased value of land with secure formal property rights versus the next best commons arrangement for property rights. ABD is the potential rent that forms the basis for the demand for property rights.

In our exposition we used distance as the proxy for scarcity but we could also use fertility of the soil or population density as alternative measures of scarcity.⁷ The framework is flexible to allow for changes in technology, preferences or new market opportunities. For example, if the demand for the output of the land increases the divergence between the rental streams may emerge at E, corresponding to the distance OG from the market center.

The increase in net present value of the resource may not rise in a smooth and continuous manner as depicted in Figure 1, but rather in discrete jumps. Nevertheless the same logic holds. The shape of the present value curve will depend on the nature and characteristics of the change that affects the resource's relative scarcity. The main sources of change are technological innovations, changes in relative factor and product prices, and changes in the size of the market. An example of technological change affecting the returns to a resource is the invention of barbed wire that allowed 19th century cattlemen in the US west to confine their cattle, thereby increasing the return to selective breeding as well as better stocking practices (Anderson and Hill, 1975).⁸ The effect of the opening of new markets to land is illustrated by the shift in comparative advantage to sugar production in 19th century Hawaii that made it profitable to privatize land (La Croix and Roumasset, 1990). Libecap (1978) examines the legislative response by Nevada from 1858–1895 to secure the rights of claimholders to the potentially lucrative silver deposits in the Comstock Lode. To extract ore from the Comstock mine required considerable investments which in the absence of secure property rights would not be forthcoming.

Many of the early studies on the evolution of property rights simply assumed that as the area ABD became sufficiently large property rights would emerge. This notion has been termed the naïve theory of property rights, as it does not analyze the collective action problems or the politics that determine the supply

⁷The framework accommodates any force that either increases (or decreases) demand or supply.

⁸In the Anderson and Hill account local groups allocated exclusivity without formal intervention by the government.

of formal property rights (Eggertsson, 1990:250). We will turn to the supply side in the next section, but here we want to delve in more depth into the determinants of ABD—the differential value of the asset from formal secure property rights versus the next best alternative informal set of property rights

There are at least four incentives which lead to the dissipation of rents if formal property rights are not supplied at the optimal time: incentives to usurp property rights from the existing holder, incentives to defend, incentives to lobby for formal property rights and incentives for sub-optimal use of the resource. Efforts to usurp take place when individuals or groups perceive an expected gain from taking the asset away from the current holder. Efforts include time, money and violence. The more insecure the property rights of the current holder the greater the likelihood that the redistribution transpires.⁹ Although the new holder may increase the value of the asset, the efforts to gain the asset are wasteful relative to a world where formal property rights were already assigned or relative to the potential costs of formal assignment through the political marketplace.

Insecure property rights may also lead to dissipation through efforts by the current claimant to defend his asset against potential claimants. In the case of land, this may include fencing the plot, patrolling it or hiring security guards. It may also include an otherwise non-optimal allocation in labor supply: the claimant may spend more time on her plot and less labor in the market in order to maintain property rights. The efforts to defend, together with the efforts by others to usurp, often lead to conflicts, which is one of the most wasteful forms of rent dissipation as the resource itself and human life may be destroyed in the process. Alston, Libecap, and Mueller (1999a, 2000), argue that the current problem of land conflicts in Brazil results from conflicting legislation that creates uncertainty over property rights to land. While the Constitution contains a beneficial use requirement for all land, which provides legal justification for squatters to occupy unproductive properties, the Civil Code allows the titleholder to request an eviction of squatters. The uncertainty over the outcome leads to strategic actions by squatters and titleholders with physical violence and deforestation contributing to dissipation.

Sub-optimal use of the asset likely constitutes the greatest form of dissipation. For example, to the extent that deforestation represents beneficial use, claimants may deforest prematurely which not only increases their private costs but may also entail social costs in terms of global warming or reduction in bio-diversity.¹⁰ Claimants may also alter their cropping decisions as a result of tenure uncertainty. Without a secure claim, farmers are more likely to plant annual crops rather than permanent crops [(Alston, Libecap and Mueller, 1999b), (Besley, 1995), (Feeder and Feeney, 1991), (Place and Hazell, 1993), (Migot-Adholla

⁹Insecure property rights may also reduce the value of the resource to the usurper; however one would expect this effect to be smaller than the effect on the probability of successful appropriation.

¹⁰Allen (2003) argues that owners may purposely reduce the value of their asset to lower enforcement costs.

et al., 1991)]. Because investment is central to economic growth property rights insecurity can be a major impediment to a country's prosperity.

When property rights are insecure, claimants may also invest too much or invest prematurely in hopes of strengthening their claim to the asset. For example, Anderson and Hill (1990) argue that homesteaders in 19th century US effectively paid for land, which was granted for free but required beneficial use, by bearing the costs of premature development. Alston, Libecap and Mueller (1999b) found evidence of the same kind of behavior in the Amazon, as did Besley (1995) in Ghana.

Insecure tenure may also limit the ability of the claimant to invest, by preventing the holder from using the resource as collateral to secure a loan from a formal creditor. In addition insecure property rights decreases the extent of the market thereby reducing the likelihood that the asset will be in the hands of the person who values it the most. In short with insecure property rights society may not exploit all of the gains from trade.

So far we have examined some of the "demand" side determinants of property rights and indicated the impact of property rights on resource use. What is missing is a better understanding of how the demand side determinants of property rights get filtered through a country's political institutions. We turn to this issue in the next section.

5. THE ROLE OF THE STATE: SUPPLY OF PROPERTY RIGHTS¹¹

The early literature on property rights focused on cases where changes in the scarcity of a resource lead to more precision in property rights at the optimal time—point D in Figure 1. Though we have no way to truly gauge optimality at a given time, the rich countries of the world stand out in their protection of property rights. Somehow, they have been able to solve a coordination problem in which the political actors refrain, particularly during crises, from acting in their short-run interests.¹² More broadly the issue can be couched in respect for the rule of law. We have some institutional proxies for the rule of law, such as independence of the judiciary or a constitutional court but fundamentally the backbone of the rule of law is a belief mechanism by the citizens and political elites that they will abide by the judgement of an independent third party arbitrator. A set of universally shared beliefs in a system of checks and balances is what separates populist democracies from democracies with respect for the rule of law. Beliefs are at the heart of why some constitutions are a constraint on behavior while others are flagrantly ignored.

¹¹The literature on the state is vast. We refer the reader to Barzel (2002) and the essays and bibliography in Anderson and McChesney (2002).

¹²Weingast (1997) highlights difficulties in establishing the rule of law, which is a broader set of rights than property rights. Nevertheless, the state with the support of the major political actors has to solve the "time inconsistency problem" in which there will always be times when the people in power have an incentive to abridge property right or erode the rule of law.

The protection of an existing set of property rights is easier than changing property rights. History is replete with examples of societies failing to change property rights at the optimal times in response to changing scarcity. The reasons for such institutional failures lie in the difficulties of compensating actors who are in a position to veto changes to property rights. Most changes in status quo formal property rights harm some people in society. In a world of homogenous participants, e.g. squatters in the Amazonian frontier or cattlemen in the 19th U.S. it is relatively easy to establish informal property rights because all parties see themselves benefiting with more exclusivity. But, when the parties involved are more heterogeneous some will see themselves losing from a change in the status quo set of informal property rights and will expend efforts to resist change to more precise formal property rights. Yet, as scarcity increases there is still pressure to establish more exclusivity. In the absence of third party specification and enforcement violence may be the least cost method for reducing the dissipation that would otherwise result.

We need a better understanding of the political and economic transaction costs associated with the state establishing or changing formal property rights that are more conducive to better economic performance, especially when it becomes obvious that the existing laws and regulations are not fostering economic growth. In many scenarios special interests are in a position to either enact property rights legislation or block legislation so that they reap the gains. Yet society is worse off by such activity. The question is: why can't "we," the citizens or consumers, buy out the special interests?¹³ There are several possible explanations for why the state does not change formal property rights in lockstep with scarcity. Here we focus on three aspects.

1. Informational problems abound such that citizens are unaware of the optimal policy moves that would improve on the status quo.
2. Even when aware, there are serious collective action problems.
3. Insecurity in "political" property rights prevents society at large from making the necessary side-payments in the political arena that would change property rights.

We will explore each in turn.

Given rational ignorance it may be that many citizens are simply unaware of property rights arrangements that would improve societal welfare. For example, under the Homestead Act in the U.S. settlers could acquire property rights to 160 acres of unoccupied federal land by residing and "improving" the land. These homestead plots turned out to be economically too small and promoted externalities associated with wind erosion. Even after the great dust bowl of the 1930s, plots remained small through subsidies by the federal government. Why did the federal government not move to reallocate land or at least not interfere with consolidation through markets? It appears that the answer rests

¹³For many societies, the poor economic performance is explained by corrupt governments, who are more or less stealing from their own citizens. Here we focus on issues besides corruption.

with the information available to citizens and their beliefs in the virtues of small landholdings. This is coupled with the efforts of local politicians to maintain a population base [Libecap and Hansen (2003)].¹⁴

Alternatively, people may be aware of the dissipation associated with the status quo arrangement of property rights, but it is in no one's self-interest to mount an organizational campaign to change the existing regulations. This is the classic collective action problem developed independently but almost simultaneously by Buchanan and Tullock (1965) and Olsen (1965). The collective action problems are particularly acute in situations entailing multiple governments across international boundaries, e.g., overfishing in international waters or global warming. The difficulties for international property rights are twofold: specification and enforcement. Specification is difficult because of knowledge or beliefs about the state of world differ (e.g. global warming) but even if beliefs are the same preferences can vary across countries because of incomes (e.g., the U.S. vs Mexico) or simply tastes (e.g., the U.S. versus Germany on green issues). Collective action problems occur in both representative democracies as well as in dictatorial regimes. We have instances of both types of regimes not specifying and enforcing property rights at what would appear to be optimal times. For example, the U.S. squandered considerable oil reserves in the early twentieth century and Indonesia mowed through a large stock of their tropical hardwoods in the latter part of the twentieth century.

A third factor affecting the lack of the emergence of formal property rights to assets is what we will term insecurity in political property rights. It may be that individuals are aware and willing to organize but there is no "market" for the emergence of property rights. Suppose that the winners from a status quo policy have the political power to veto or allow policy changes. Given their power, they would be foolish to acquiesce to policy moves that made them worse off, even if it was wealth enhancing. But, they would allow such a policy move if they were compensated. The actions of the Landless Peasants' Movement (MST) in Brazil are consistent with this argument. The MST is very effective at swaying public opinion and thereby prompting politicians, to expropriate land and transfer it to peasants. But, they do not support deeding the land to peasants. The MST prefers to keep the peasants dependent on the MST as a collective because it is easier for them to extract payments from the group than individual farmers [Alston, Libecap and Mueller (2002)].

Why is it that we generally do not allow such side-payments? One answer is that transparent side-payments would undermine the legitimacy of the organization, whether the organization is the MST, a union or a government. If the current property rights arrangement is viewed as inferior to an alternative, people "believe" that they should not pay to move to a better property rights arrangement. The result is institutional lock-in. Yet, there have been examples of improving

¹⁴In the latter part of the 19th century Major John Wesley Powell recognized the potential problems of settlements in the arid or sub-humid regions of the country but his Reports to Congress were ignored in favor of boosterism [Stegner (1954)].

the status quo for all parties involved. A case involving the sale of water in the 1990s illustrates the difficulties in changing the status quo. The Imperial Valley Irrigation District, which is a governmental unit that has jurisdiction over water, entered into a contract to sell some of their water to the city of San Diego.¹⁵ The Imperial Valley Water District has property rights to water that are subsidized by U.S. taxpayers. As such they can sell water at prices higher than they pay. Interestingly, the members of the Imperial Water District imposed upon themselves that they would only sell water that they have conserved through better irrigation technologies. The interesting question is: why didn't they fallow all of their land and sell their entire water allocation. We speculate that they were concerned about the political fall-out that could have resulted in the district losing their current subsidy. In short, it appears as if they have secure property rights to the rental stream of water but not the clear "political" property right to the stock.

Another factor promoting the insecurity of political property rights falls under the rubric of credible commitment. In representative democracies politicians face the demands of constituents who may be harmed or benefited from a re-arrangement of property rights. The demands of the majority of voters may not coincide with the optimal arrangements of property rights, and politicians can not commit to making side-payments over time to compensate the losers. Authoritarian regimes are subject to similar problems associated with catering to populist demands. A good example of this was the infringement in property rights by Peron in Argentina in the late 1940s. Peron imposed rent and price controls in the Pampas, the most fertile and productive agricultural producing area in Argentina. The punitive arrangement in property rights lead to a decline in investment which, along with political instability, affected growth in the long-run [Alston and Gallo 2003]).

A more cynical view of political behavior suggests that we do not want to encourage paying for changes in property rights because it would promote the creation and maintenance of non-optimal property rights in order to be paid to move to a more optimal situation. Campaign finance and corruption around the globe may be testimony to special interests trying to "bribe" politicians to maintain or change property rights. In some instance politicians may use part of the contributions to make side-payments [Norlin (2003)].

6. THE EVOLUTION OF PROPERTY RIGHTS IN THE BRAZILIAN AMAZON: AN ILLUSTRATIVE CASE OF THE DEMAND AND SUPPLY OF PROPERTY RIGHTS¹⁶

The evolution of property rights in the Amazon since the early 1960s illustrates the demand and supply forces at play in the development of property rights.

¹⁵For information about the sale, we thank Clay Landry of the Political Economy Research Center, Bozeman, Montana.

¹⁶This section draws on Alston, Libecap and Mueller 1999b and Alston, Libecap and Schneider 1996.

During the 1960s the military governed Brazil. Driven by concerns over national security and an effort to shift some of the burgeoning rural-urban migration to the Amazon, Brazil embarked on several programs to develop and populate the Amazon. The initial effort was known as “Operation Amazonia.”

During the 1960s and 1970s Brazil launched several programs to develop the Amazon. They established colonization projects and recruited settlers from Southern Brazil, who were displaced by mechanization. Sponsored colonization projects also induced spontaneous migration from nearby northern and northeastern states. Typically, the settlers from the Northeast had less human and physical capital than the settlers from the South of Brazil.

To encourage migration and establish settlement Brazil undertook the construction of several major highways which made the Amazon more accessible. Examples include the Transamazon highway and the Belém-Brasília highway. In addition to people, the government encouraged capital investment through fiscal incentives, which meant that corporations establishing ranches in the Amazon could reduce their tax burden.

In the early years there was little conflict over land. On the frontier, settlers typically did not have title but established informal property rights of about 150 hectares. Settlers respected the informal property rights to land and when land was exchanged a receipt served as testimony to the transaction. Informal property rights proved sufficient to induce settlement without conflict but we note that the settlers were relatively homogeneous. Over time many informal claims became titled either through efforts of the settlers themselves or politicians who wanted their votes. This was a process of both demand forces—settlers demanding titles because of the anticipated benefits—and supply forces—for political reasons the state of Para titled more expeditiously than the federal government.

Titles mattered. Amongst smallholders having a title increased the value of land by about 20%, holding investment and distance to market constant. This result is consistent with titles lowering defense costs and broadening the market. As expected titles increased investment in fencing and permanent crops—in our survey by about 40%. The process described here of settlement with informal claims eventually leading to formal titles fits the model developed in Sections 2 and 3.

In colonization projects sponsored by the government, there was little conflict over property rights because the government provided titles to those settlers who they recruited. Even in spontaneous settlements near colonization projects there was little conflict because the colonization projects tended to be built on relatively low-valued land so squatters could occupy an alternative plot of land rather than fight over an existing informal claim.

Some squatters occupied unused private claims but here too there was initially little violence. Squatters had the legal right to occupy private land and **if not contested** had the right to a title after 5 years. If contested the squatter had the legal right (though *de facto* at the discretion of the landowner) to be paid for improvements and could be evicted. There was little violence because the

squatters knew that the local courts and police sided with the landowner. When asked to leave, the squatters left.

Over time as the density of settlement increased both squatters and landowners placed a higher value on land. As such there was more at stake when squatters invaded and occupied private land. Nevertheless, squatters faced a collective action problem and land owners still had the courts, police and hired gunmen on their side. The status quo might well have continued had it not been for some priests who undertook to organize the squatters into large groups to resist when asked to leave. Conflicts and associated violence escalated in the late 1970s and throughout the 1980s because the outcome became less certain.

In response to a concern by the public over the increase in land conflicts, the federal government put more emphasis on land reform programs. As institutional background it is important to note the roles played by the civil code and the constitution. The civil code gives strong protection to property owners. In short, if squatters occupy private land the landowner has the right to ask the state to evict the squatters. Simultaneously, the most recent constitution in Brazil (though similar to clauses in previous constitutions) stipulates that land should be used in the "social interest," which typically means productive use, i.e., not in forest. If land is not in productive use the federal government has the power to expropriate it. The compensation should equal the market value of the land, however the government accomplishes the expropriations through 20 year government bonds that sell on the secondary market at a discount. The proponents of land reform in the government used the social use clause in the constitution as the basis for expropriations that they then turned over to squatters.

The ideal agenda that the government had in mind was one where the government would select unused land prior to any invasion by squatters, expropriate the land and then give the land to deserving landless farmers. The agenda of the government was short-lived. Squatters learned individually and collectively that the way to get land faster was to invade private land in order to prompt the government to intervene. The government could not intervene everywhere because of its limited resources so getting the government's attention was crucial to the squatters successfully getting land expropriated in their favor. The evidence indicates that it was easier to get the government involved if there was an existing settlement in the county. The irony is that land conflicts increased in counties where the government had expropriated land in the past and transferred it to squatters. Put another way, the government's land reform efforts increased land conflicts.

The government's agenda was further hijacked through the entrepreneurial efforts of the Landless Peasants' Movement (MST). The MST originated in the South but shifted some of their efforts to the North. The MST knew that violence associated with land conflicts was harmful to the domestic and international reputation of politicians. The MST organized large groups of squatters to invade an unused plot of land while simultaneously announcing the time and place of the invasion to the media and the government. The intent of the announcement

was to induce the federal government to intervene so as to prevent bloodshed. It took time for the intent to be realized but by the late 1990s violence over land had diminished.¹⁷

Despite the publicity received by land conflicts and land reform, it has not lead to a dramatic change in the percentage of farms operated by squatters. The major reason is that there are millions of landless peasants and the federal government is income-constrained, i.e., the expropriations must be compensated. Even on the expropriated land, titles have not risen as much as expected. Partially this is due to the MST who prefers the landless peasants to remain dependent and consequently eligible to receive subsidized credit from the government, of which the MST gets a 2 to 3% cut.

The conflict over property rights has had some unintended effects on forests. Recall that the federal government has the authority to expropriate land not used in the social interest. Social interest is a vague criterion but in the Amazon it means that land held in forest is not in beneficial use. As a result some landholders deforest as a means to better secure their land. How much deforestation occurs as a result of land conflicts or efforts to secure land remains an unanswered research question.

Part of the difficulty in maintaining forests intact in the Amazon is that the government has an incentive incompatibility in its land reform and forest policies. As an example, in 1965 Brazil passed a law requiring landowners to keep at least 50% of their property in forest. In 2001 President Cardoso increased the reserve to 80% through an executive decree. But, because enforcement of property rights on private forest land is difficult, due to the enticement of squatters and the possibility of expropriation, landowners chose to ignore the law for the most part. Further encouraging disregard of the law was the difficulty of enforcement by the government because of high transportation costs.

Nevertheless, the law must have imposed some costs on landowners because they spearheaded a bill in Congress to rescind the law. Representatives of landowners in Congress introduced a bill in 2002 that reduced the required forest reserve from 80% to 50% as well as providing compensation to landowners who held more than 50% of their land in forest. The bill sailed through the committee in charge but Congress dropped it on the floor, following an announced veto by President Cardoso who was responding to public opinion [Nepstad et. al (2002); Sato and Silva (2001)]. Though landowners lost this legislative battle, they won in the field where they ensured that the bureaucracy in charge was understaffed or bribed. As a result the 80% requirement in forest is routinely violated with no consequences. For example, in 1996 the average

¹⁷This was not the only reason for the decline in conflicts. By the late 1990s the MST had shifted part of their focus to securing more credit for existing settlements. In addition the fiscal situation of the federal government worsened so that all parties realized that the federal government had fewer resources to expend on land reform.

area in forest cover in six states in the Amazon (weighted by area) was only 47.5%.

What lessons do we learn from this example of the evolution of property rights to land in the Amazon? The short answer is that the assignment and enforcement of property rights to land is not a purely demand driven story: the supply side also matters. This should come as no surprise to economists and certainly will come as no surprise to political scientists. Though there is recognition of the importance of political factors as determinants of property rights, there is no corresponding supply-side theory to match the demand side theory of property rights. Our goal in presenting the example of the Amazon is to encourage other scholars to undertake similar case studies of the development of property rights in other times and places so that we can advance from the framework presented here to ultimately a theory of property rights development. A more comprehensive theory of property rights to land will enable us to design better land polices throughout the world that are not only more efficient and equitable but also less prone to conflict.

7. CONCLUDING REMARKS

In this essay we presented a framework for analyzing the determinants of property rights. We can conceptualize the forces for changing property rights as the lost rent from a different set of property rights. In relatively homogeneous societies the supply of property rights may come from the participants themselves. Examples include the codes established in mining camps or the rules established by Cattlemen's association or the norms accepted by squatters. The supply of formal property rights typically emerges from an increase in the heterogeneity of the participants or an increase in the inherent rent of the asset causing a "race for property rights." The state generally has a comparative advantage in violence and hence better capabilities than private actors for the specification and enforcement of formal property rights. Enforcement by the state is never complete because it would be prohibitively costly in money and intrusion was it to attempt to do so. We illustrate the framework by presenting a brief case study of the development of property rights in the Brazilian Amazon.

The comparative advantage of the state in protecting property rights begs the question: if the state can protect citizens from stealing from one another, what protects the state from stealing from its citizens? A short answer is very little; over time and across space many states have plundered their constituents to satisfy their self-interest. But, this has not been the case in the wealthy countries in the world. In the essay we suggest that the answer ultimately rests in the development of a set of beliefs by the citizens and political elites that they all will be better off in the long-run by abiding by the rule of law. Day to day this may not be difficult; the stress comes during times of crises. A more definitive

answer to this question is beyond the scope of this essay but it is surely the holy grail of many political scientists and economists.

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