

De Facto and De Jure Property Rights: Land Settlement and Land Conflict on the Brazilian Frontier in the 19th Century

Lee J. Alston
University of Colorado

Edwyna Harris
Monash University

Bernardo Mueller
University of Brasilia

Resumo

Este trabalho examina a evolução da ocupação da fronteira agrícola no Brasil no século 19 através de um arcabouço teórico que analisa a interação entre a ocupação de terra e a emergência de direitos de propriedade *de facto* antes do estabelecimento e garantia de direitos de propriedade *de jure* pelo governo. Neste arcabouço as rendas (*rents*) associadas com maior exclusividade inicialmente geram uma demanda por arranjos de propriedade comum, porém normas informais e política também determinam que formas organizacionais surgirão. Em algum momento escassez irá gerar uma demanda por exclusividade maior do que pode ser sustentado por arranjos informais de propriedade comum, e os ocupantes irão demandar direitos de propriedade *de jure*, ou seja, títulos formais. Conflitos serão reduzidos quando o governo alocar os direitos de propriedade àqueles que ocuparam a terra primeiro. No entanto, esta alocação e a decisão de realmente policiar os direitos de propriedade *de jure* depende da existência de interesses políticos neste sentido.

Palavras-chave: Direitos de propriedade, fronteira, terra, propriedade comum.

Abstract

This paper examines land settlement and conflict on the Brazilian frontier in the 19th century. We are interested in the emergence, sustainability, and collapse of commons arrangements in specific historical contexts. We presents a conceptual framework to better understand the interaction between settlement and the emergence of *de facto* property rights on frontiers prior to governments establishing and enforcing *de jure* property rights. In this framework, potential rents associated with more exclusivity drives “demand” for commons arrangements but demand is not a sufficient explanation; norms and politics matter. At some point enhanced scarcity will drive demand for more exclusivity beyond which can be sustained with commons arrangements. Claimants will therefore petition government for *de jure* property rights to their claims – formal titles. Land conflict will be minimal when governments supply property rights to first possessors. But, governments may not allocate *de jure* rights to these claimants because they face differing political constituencies.

Key words – Property rights, frontier, land, common property.

Área 2 – História Econômica

JEL classification: D72; Q15; N40; N50; O17; K11

De Facto and De Jure Property Rights: Land Settlement and Land Conflict on the Brazilian Frontier in the 19th Century

I. Introduction

We define the frontier as land that is too far from the central government such that the initial enforcement of property rights by government is prohibitively expensive. We examine the way in which the extant specified property rights in each country affected settlement and in particular the potential and emergence of subsequent land conflict. Property rights, along with relative prices, provide the incentive for settlement and conflict on frontier lands. Property rights can be either *de facto* or *de jure*. By *de facto* we mean that the property rights are specified by first person (an individual claims the land) or second person (a group assigns rights or norms emerge) while *de jure* rights are specified by a government with recognized authority. Both *de facto* and *de jure* rights may be enforced by first person (self-enforcement); second person (norms or rules of a group, club or association) or third party (private militias or government). When land is relatively abundant, informal *de facto* property rights may arise to limit dissipation, entice entrants, and yet avoid conflict. As land becomes scarcer, settlers have the incentive to form a commons arrangement to exclude outsiders and thereby limit the potential dissipation from the resource. As entrants become increasingly heterogeneous with respect to endowments, *de facto* commons arrangements may not suffice to limit dissipation, and claimants have an incentive to lobby the government to turn their *de facto* claims into *de jure* property rights with government enforcement. But, the economic rents may not be sufficient for property rights to emerge because political rents may vary from the economic rents.

Because of competing demands for *de jure* rights by heterogeneous claimants, governments may opt not to legitimate the *de facto* claims of the initial entrants yet they may not enforce the specified *de jure* rights of alternative claimants. We found that the greater the time between the specification of *de jure* property rights and their enforcement the greater the potential for rent dissipation, particularly violence between those holding and enforcing *de facto* rights and those with specified but not enforced *de jure* rights. The determinants of the specification and enforcement of *de jure* property rights depends on the political power of the competing claimants. Where the political power of incumbents is high (Brazil) *de jure* rights will tend to support the *de facto* rights. Alternatively, where political power is mixed, such as in Australia and the U.S., the specification and enforcement of *de jure* rights may not coincide. Incumbents may retain *de facto* rights because of little enforcement by the government, but incur costs to prevent the *de jure* right holders from exercising their specified rights. The ability to retain *de facto* rights in the face of someone else holding the *de jure* rights rests on political, wealth and violence advantages for the “first possessor” (home court advantage).

In Section II we first present a matrix showing the possible combinations of property rights which highlights the roles played by economic rents, norms and politics. Following this we present a demand driven framework for the initial settlement of the frontier which by definition entails settlement with *de facto* rights either self-enforced or second-party enforced. The framework highlights the likelihood for conflict over property rights as rents increase. Conflict dissipates some of the rents of settlement and frequently leads to a demand for *de jure* property rights. After a discussion of our demand framework we develop some hypotheses about the political supply of the specification and enforcement of rights. In subsequent sections we use concepts about economic rent, norms and politics to analyze the settlement of the Brazilian

frontier in the 19th century along with the potential and realization of land conflict over property rights. We are interested in examining the emergence, sustainability, and collapse of *de facto* arrangements as well as the ultimate specification and enforcement of *de jure* property rights.

II. Property Rights and Land Settlement

Property rights affect the timing of settlement as well as the use of land. A full set of property rights includes 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 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. If one possesses the full set of property rights, resources will be utilized optimally. But, a full set of property rights never exists because there are some margins of use that are too costly to specify and enforce as Ronald Coase (1960) noted years ago: "sometimes it costs too much to put the matter right." As a result some attributes may be either *de jure* or *de facto* left as open access.¹ Individuals and groups have incentives to expropriate use rights over attributes that the state leaves as open access. For land settlement this could lead to different types of behavior which can dissipate the rental value of the land. If land is open to squatting on the basis of first possession then people will dissipate some resources in the race to claim land (Anderson and Hill 1990). If land is left in open access, this may lead to overuse of the land in the familiar problem of the "tragedy of the commons," unless rules about use become specified and enforced. Furthermore, unless occupants of land have a formal title to their land, along with the enforcement by the state, occupants will expend resources defending their claim. In the absence of formal specification and enforcement of titles to land, individuals will have an incentive to reach collective agreements to prevent trespass from outsiders as well as expend individual resources to demarcate and defend claims.

We illustrate the six possible arrangements of property rights in Table 1 where the columns vary according to who specifies the property rights and the rows vary by who enforces the rights. On both dimensions the possible actors are first person (the claimant), second party (a group of claimants collectively) or third party (government or e.g. gunmen). First party specification and enforcement, the top left cell in Table 1, occurs when scarcity is low. An individual moves to the frontier and claims land. The person typically demarcates his claim in some fashion and because scarcity is low there is little threat of his keeping the land. As other claimants move to the frontier the potential for rent dissipation increases and enforcement may be transferred either to a second or third party. Enforcement by a second party occurs when norms develop such that new entrants respect existing claims. These norms are generally based on a shared cultural endowment within a small group. In this case, there is first party specification but second party enforcement (first column, second row of Table 1). This arrangement may be sufficient to limit rent dissipation and violence during the early stages of migration to the frontier because land scarcity is relatively low.

Where norms do not evolve or are not sufficient to deter encroachment, second party enforcement may be replaced with third party enforcement of *de facto* rights (first column, bottom row of Table 1). At this point, incumbents will hire agents or use local government to enforce their claims.² Settlers may employ third parties, who take on the role of a private militia or police force creating a violence advantage over new comers. Employing agents to enforce

¹ Barzel (1989) makes this point most explicitly and clearly.

² We will discuss in more detail later the advantages of the first possessors, one of which is the capture of local governments. We will later refer to the advantages as the "home court" advantage.

member claims is beneficial when individuals claim large areas reducing their ability to police and defend these claims. Agents may utilize violence to defend their employers' claims against entrants. Alternatively, individuals may rely on local government to enforce claims even though specification of *de jure* rights do not exist or are not in the hands of the government enforcer. All three cells in the first column indicate that the claimant(s) established *de facto* property rights. However, formal commons arrangements that is, the creation of clubs or associations is absent. For clubs or associations to form either norms must be very strong or the returns to an individual from the collective must be sufficiently high to rise above the familiar free rider problem.

Table 1 – Specification and Enforcement of Property Rights

Specification of Property Rights			
Enforcement of Property Rights	1 st Person Specification	2 nd Party Specification	3 rd Party Specification
	1 st Person Enforcement	1 st Person Enforcement	1 st Person Enforcement
	1 st Person Specification	2 nd Party Specification	3 rd Party Specification
	2 nd Party Enforcement	2 nd Party Enforcement	2 nd Party Enforcement
	1 st Person Specification	2 nd Party Specification	3 rd Party Specification
	3 rd Party Enforcement	3 rd Party Enforcement	3 rd Party Enforcement

As competition for land increases with the number of new arrivals at the frontier there may be a shift away from first to second party specification. Second party specification leads to the creation of commons arrangements such as, clubs or associations. Formation of clubs or associations is more likely when groups are small, homogenous, geographically proximate, and shared norms exist. Once formed enforcement of the club's claims may be undertaken by either the first, second, or third party; these arrangements correspond to the cells in the middle column of Table 1. Exactly who bears the costs of enforcement once *de facto* property rights have been established is determined by the interplay of economics, norms and politics. In some instances, column 2, row 1, clubs define rights but there is still self-enforcement. This is a situation where claimants all gain legitimacy from the club and do not intrude on each other but the defense against outsiders remains in the hands of the individual claimant. A more general outcome is *de facto* (commons) specification and enforcement- column 2, row 2. For this reason, one advantage of creating a formal commons is to spread defense costs across a group of individuals all of whom incur a smaller marginal cost than if they undertook defense individually. In addition to defense from outsiders, e.g. aboriginals or exclusion of new entrants, there may be other collective benefits from specification and enforcement in the same hands. If the land is used in common, then rules about use will limit the dissipation of rents from overstocking. The benefits from organization are greater for specification and enforcement if there are additional collective goods provided by the commons for which there exist economies of scale.

In the absence of exogenous shocks, second party specification and enforcement may remain stable over a long period. However, there may be a point at which second party enforcement is no longer sufficient to prevent encroachment. For example, legislative changes may induce competition for land, increasing the costs of collective defense. At this point, the club may find it cost effective to hire third party enforcement or, local governments may enforce the rights of the commons even though they did not define the rights. Much like the case where there is first party specification and third party enforcement, employing agents to enforce member claims is beneficial when the geographical area of defense is large compared with member numbers.

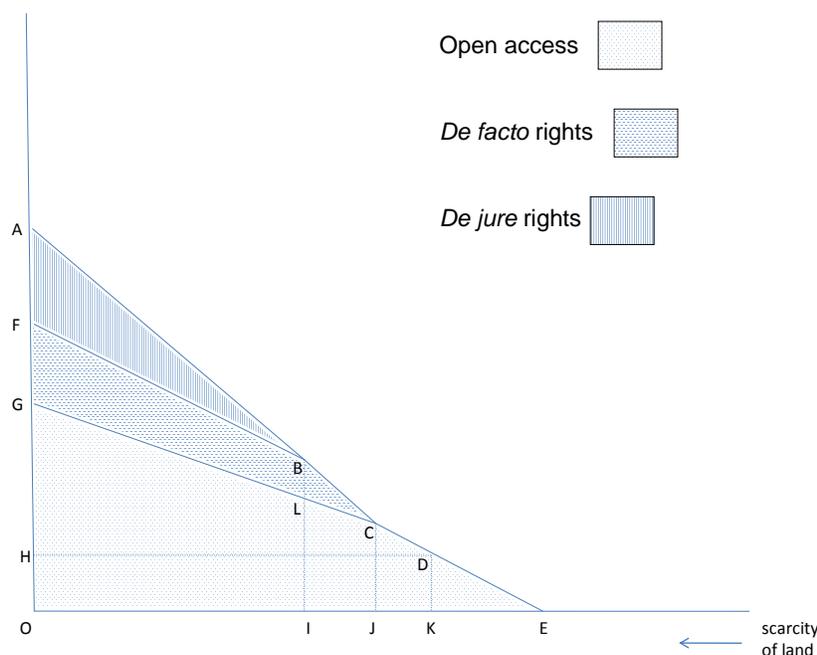
Alternatively, the club may rely on government to enforce member claims even though *de jure* rights are absent. In this case, local officials enforce *de facto* land claims either because club members are local officials or because government officials can obtain economic and/or political rents from the club. In some instances the association may offer monetary compensation for government enforcement by paying bribes. Assuming some degree of democracy exists, political rents are the currency the club can offer local officials in return for enforcement, specifically votes or campaign contributions.

Column 3 contains the cells for the specification of *de jure* rights, which by definition means specification by the authorized government. Government specification often takes place after the creation of *de facto* rights and it is at this point that *de jure* rights can either recognize the *de facto* claimants or undermine the existing *de facto* rights. Governments may choose to define but not enforce *de jure* rights – column 3, rows 1 and 2. As with earlier rights structures, economics, norms and politics may play varying roles over time and space. For example, with an extended suffrage, politicians may assign property rights to redistribute land away from the *de facto* claimants, who may have the highest economic return. Further, if *de jure* rights do not support the prevailing *de facto* allocation the government will increase the potential for conflict if they choose not to enforce the *de jure* rights – rows 1 and 2. Government specification and first party enforcement means that individuals must defend their *de jure* rights against others. In this case, the costs of defense may outweigh the benefits of the *de jure* rights, therefore individuals will opt against migration to the frontier. This will lower the likelihood of conflict between newcomers and incumbents by limiting competition. Government specification and second party enforcement (middle cell, bottom row of Table 1) exists when the government allocates *de jure* rights but enforcement takes place via a commons arrangement. Enforcement by a commons arrangement may emerge where governments either lack sufficient resources to enforce claims or choose not to enforce *de jure* rights for political reasons. If clubs did not previously exist prior to government specification, they may be formed at this point with their sole purpose being to defend the rights of extant claimants against encroachment. The final and most complete category of *de jure* rights is where there is government specification and enforcement of property rights. Here the government allocates and enforces rights, reducing the potential for conflict because we assume that governments have a comparative advantage in violence.³

As discussed earlier economic rents, political rents and norms all play roles in the specification and enforcement of property rights. To better understand the roles played by each we will first present a “demand” driven framework for the emergence of property rights. The core of the framework is that economic rents drive the determination of property rights. We illustrate in Figure 1 the “demand” for more secure property rights as a function of its scarcity value. 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 claimant of that resource. The line segment *ABCDE* shows that the net present value of the resource decreases as it becomes less scarce. We assume that the line segment *ABCDE* represents the highest return from using the resource with varying amounts of capital or labor.

³ This assumption flows from numerous accounts of the role of the state in preventing the dissipation of rents. For recent treatments see Acemoglu and Robinson (2006) and North, Wallis and Weingast (2009).

Figure 1- The Demand for and Evolution of Property Rights



The returns from land use given relative prices may be greater for relatively capital intensive activities e.g., cattle ranching or more labor intensive activities, e.g., pre-mechanized agriculture. In the case of land the measure of scarcity value could be the distance of a plot of land to a market center, as transportation costs are often the main determinant of land value. At point *E* land is so far from the market center or so abundant that the economic return is zero. The segment *GLCDE* represents the net present value of land under an open access arrangement. *OH* represents the opportunity cost of the settlers with the lowest opportunity cost, given the costs of settling on the frontier.

Settling on the frontier will vary considerably with climatic conditions. For example, the fixed costs of migrating and sustaining a subsistence standard of living are lower in tropical regions than in colder climates, where settlers may have to wait a year to plant and harvest crops. In Figure 1, point *K* represents the economic frontier where it becomes worthwhile for a settler to migrate to the frontier.⁴ At points between *J* and *K* open access conditions prevail which means that 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. Though land is abundant, migrants may find it worthwhile to establish norms pertaining to the amount of land claimed.⁵ This appears relatively easy to do because initially the settlers are relatively homogeneous with respect to their opportunity costs and typically other socio-economic endowments. In terms of our taxonomy this would be second party specification and first person enforcement.

⁴ In our figure, distance is the frontier but it could as easily be the quality of soil. Our framework of “rents” determining arrival times on the frontier under open access conditions is an endowments explanation but for both commons arrangements to emerge as well as formal rights, norms or politics will matter.

⁵ We recognize that this assumes that norms are partially driven by rents.

As the net present value increases, e.g. because of lower transportation costs or higher prices for the output of the land – represented here as the upward sloping line segment CD as one moves leftward from K - 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 distance IJ resource users still tend to be relatively homogenous, but the return from an open access resource - $ILCJ$ - is lower than moving to a more limited commons – $IBCJ$ - one in which new entry is restricted. The relatively higher return from a commons arrangement excluding outsiders creates the demand for informal property rights, which are sufficient to mitigate the otherwise existing dissipation of the rental stream. It is easier for homogeneous users to reach agreements concerning exclusivity for two reasons: 1) the claimants generally share similar cultural norms (endowments); and 2) in some instances there is a common collective good that will bring people together to reach agreements. With a common cultural background, potential disputes are easily defused as social pressure along with the incentive to cooperate yields higher expected returns than confrontation. The most obvious collective good is common defense to prevent encroachments from potential claimants. Squatting prevails yet the absence of government-enforced private property rights does not pose significant costs.⁶ The wedge BLC is the marginal return from switching from open access with limited norm specification to collective or commons arrangements for land in region IJ . In our taxonomy this is a movement from second party (norm) specification with self-enforcement to second party specification and enforcement. There is a gain to having a commons arrangement consisting of *de facto* property rights, as opposed to open access, but not yet for having formally defined property rights. That is, the level of competition for land is sufficiently high that open access would lead to losses, but not sufficiently high for formal property rights to be an improvement over commons arrangements.

For land in the region OI , closer to the market center, NPVs are higher, and 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 *de facto* to *de jure* property rights. At some point it becomes beneficial in the aggregate to have officially defined and enforced *de jure* property rights. The increased value that would result from formally defined and enforced *de jure* property rights is the pie-shaped area ABF which represents the increased value of land versus the next best commons arrangement for property rights. ABF is the potential rent that forms the basis for the demand for *de jure* property rights. In our taxonomy this would be a movement from second party specification and enforcement to third party specification and enforcement. Nevertheless, the movement from a commons arrangement to *de jure* property rights entails redistribution which in turn generates the potential for conflict, an issue we return to later.

Many of the early studies on the evolution of property rights simply assumed that as the area ABF became sufficiently large *de jure* 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 of formal property rights (Eggertsson, 1990:250). In order to bring into the analysis the supply of property rights we extend our model so as to

⁶ See Anderson and Hill (2002); Eggertsson (1990); Ostrom (1990); and (2009); and Umbeck (1981) for accounts of local groups allocating resources under “common” arrangements. See Smith (2000) for an analysis of “semi-commons” arrangements.

explicitly incorporate the fact that competing types of settlers with a different set of endowments typically arrive at different times at the frontier.⁷ In our case study these different groups are, in order of arrival, large coffee plantation owners with slaves versus smallholders in Brazil. By focusing on the different endowments of the competing groups we can analyze the disputes that arise over land and make inferences about how these differing endowments affect the political outcome that ultimately decides the form of the property rights that will emerge.

As stated in our initial discussion of Figure 1 the NPV from land may vary by whether the land is put into cattle or agriculture. Relatively abundant capital versus labor endowed claimants may face separate NPV schedules due to different access to inputs required to make the land productive, such as capital, technology or experience. Once we incorporate different payoffs from using the land, it becomes possible for the first entrant to have higher opportunity costs than the subsequent arrivals, for example in Brazil where large coffee plantation owners preceded smallholders. These situations are depicted in Figure 2 where two sets of NPVs are superimposed. The set with higher NPVs for land in a given region is marked with capital letters and, to simplify the exposition, will be referred to as ‘capital’ whereas the lower set, with non-capitalized letters, will be referred to as ‘labor’.

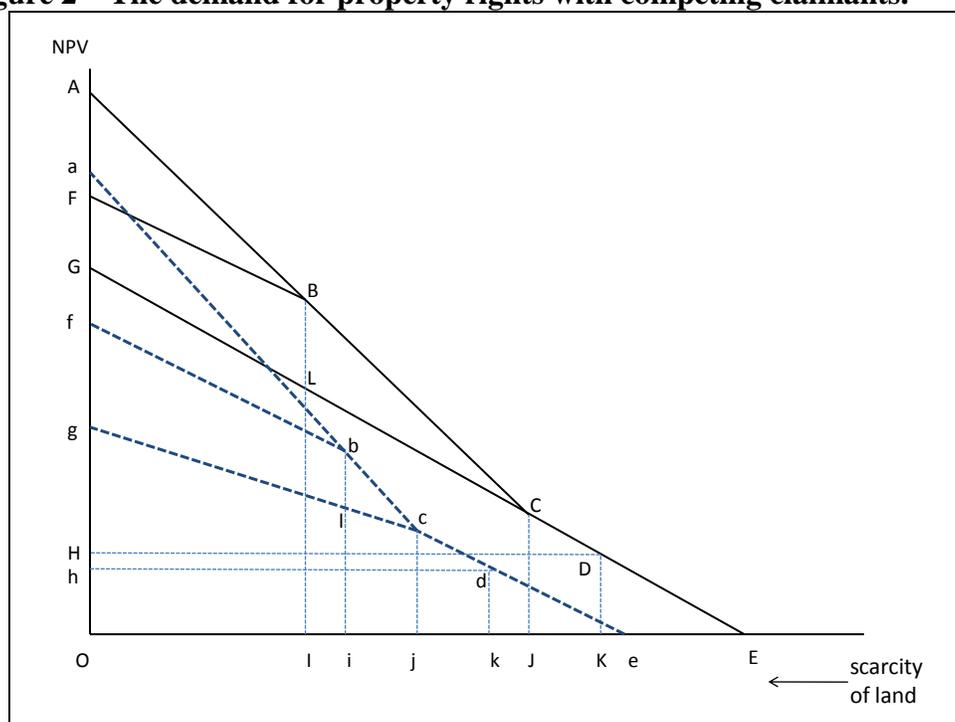
As drawn in Figure 2 capital arrives at the frontier at K prior to labor which arrives at k , despite the fact that capital’s opportunity cost is higher than labor’s, $OH > oh$. Naturally different relative opportunity costs and NPVs could lead to labor arriving first.⁸ Whatever the case, the asynchronous nature of arrival allows one group to establish and entrench itself on the land, possibly for a long period of time. When the second type of claimant arrives the NPV curves of the incumbent adjust themselves to reflect the increased competition. This adjustment would typically involve three movements; (i) an overall decrease of the NPV at each point; (ii) an increase of the area of the wedges that represent the gains to having *de facto* commons arrangements versus open access as well as the gains from *de jure* property rights over commons arrangements; and (iii) a rightward shift of points J and I with *de facto* commons arrangements and *de jure* property rights becoming desirable earlier given the presence of a new entrant. The curves of the entrant already reflect in “Cournot” fashion the NPVs that take into account the incumbent’s presence.

If we consider Figure 2 to represent the situation after the adjustment of the incumbent’s payoffs to the threat of entrant’s arrival, we see that to the left of point k both types will find it in their interest to be on the land. The more to the left, that is, the higher the return to the use of the land, the greater will be the competition among the groups. The greater this competition the greater will be the incentive for commons arrangements to emerge and the greater will be the demand for *de facto* and later *de jure* property rights.

⁷ Libecap (2007) stresses this point.

⁸ As drawn the figure implies that one type of claimant would always be able to make more productive use of the land at each distance for a given type of property rights, implying that in order to achieve efficiency the most valued user should retain the use rights and ultimately the government should allocate property rights to the highest valued user. However, it can very well be the case that one use of the land, such as ranching, is more productive in a frontier situation (towards the right of the graph) and another type of use, e.g. agriculture, is more productive once the frontier has evolved (towards the left). In this case inefficient land use would arise if i) secure property rights – though these may be informal – were not in place to facilitate the transfer of the land to its higher user, or ii) users are unable to quickly change their use of the land, i.e. ranchers becoming farmers.

Figure 2 – The demand for property rights with competing claimants.



Initially *de jure* property rights will be non-existent, but as value increases, the potential “rents” will be an incentive for the government with authority to act which may: sustain the incumbent’s *de facto* rights; redistribute the specification and enforcement of *de jure* rights towards the entrant; or any myriad intermediate combinations, the most common of which appears to be specification without enforcement. Clearly the outcome depends on the result of politics, which involves not only the incumbent and the entrant, but also local and the central governments, including their voters and constituencies.

The question that arises is whether anything can be said about the determinants of the supply response by governments. Though we cannot predict specific outcomes, we can discuss the characteristics of the claimants along with the political institutions in place both of which affect the supply of property rights.⁹ Once the new entrant has arrived on the frontier there is the potential for dispute and conflict. This dispute plays out both physically, *in loco*, as well as politically. It is almost tautological that *ceteris paribus* the greater the relative capabilities for violence of one group over the other, the greater the probability that the emergent *de facto* property rights will favor that group. But this prediction can become more precise if we note that the sequential nature of the groups’ arrivals implies that the early entrant will have a “home court” advantage as it is often easier to defend than to usurp.¹⁰ This advantage is particularly

⁹ The degree of suffrage appears to be an important determinant in our case studies.

¹⁰ Smith (2002: S482) argues: “In common-pool arrangements regimes, exclusion seems to be basic in the sense that efforts at exclusion are the first methods used to define property in a resource. The evidence from English land use is consistent with early exclusion.” Smith (2002) gives numerous other examples consistent with current “rights” holders using exclusion successfully to deter entrants. Acheson’s (1979 and 1988) discussion of the use of exclusion amongst lobster fishermen is a particularly good example consistent with “home court” advantage. Smith (2002: S485) also makes the excellent observation that in deciding between governance and exclusion as

significant in the situation portrayed in Figure 2 where the incumbent was drawn to the frontier by high benefits rather than by low opportunity costs. In addition there may be further rents that the incumbents capture through information gathered over time by being on the land. These benefits translate into economic and potentially political clout that enhances the home court advantage. Thus the greater the head start of the incumbent, that is, the time between K and k , and the greater the incumbent's NPV in that period, the greater the likelihood that the incumbent will retain *de facto* property rights. The "home court" advantage should also help in the political allocation of rights which the incumbent would demand at distance J and the entrant at distance j . Importantly, which will become clear in our case studies the specification of *de jure* rights may be part of the NPV of the entrant. The home court advantage translates into more resources to lobby for *de jure* property rights by the incumbent compared to the entrant as well as lobbying for a lack of enforcement of *de jure* rights in the case that this caused new entrants. But, lobbying is not the sole factor determining the government's specification and enforcement of property rights.

Another important characteristic of the competing claimants for determining the supply of property rights is the relative size of the gains from having *de jure* property rights, versus losing completely to the other claimant. In other words, the claimants would be willing to expend everything above their opportunity cost to secure the right though in principle one would only need to expend an amount greater than the alternative claimant. For the "capitalist" he would be willing to expend area $HABCD$ and for labor, she would be willing to expend $habcd$.¹¹ These areas measure the rents over opportunity cost from getting effective *de jure* property rights for each group assuming all entrants within a group have the same opportunity cost. To the extent that opportunity costs increase for later entrants then the willingness to pay would be less. In the political world the amount that they would need to pay most likely would be substantially less because of only needing a winning coalition. It is not the case that we can simply compare both values and infer that the one with the larger gains will prevail as the outcome depends as well on other circumstances such as the preferences of the actors involved in the political process. Nevertheless, we can infer that for any given political process, the differences in the relative gains to each group will increase their willingness to invest in lobbying and increase the probability of a favorable outcome to that group¹² – though the outcome for the capitalist may simply be a lack of government enforcement of the extant *de jure* specified rights of the new entrant.

The distribution of the gains from secure formal property rights among the members of the same group may also be a characteristic with important consequences for the property rights that get supplied. Note that in Figure 2 these gains are triangle-shaped (ABF and abf), implying that some members of the group receive greater gains from secure private rights than others. One could imagine a situation in which that area would be closer to a rectangle with most members receiving similar gains. Under such circumstances the collective action which is crucial for mounting the demand for property rights may be easier to achieve than in the case where the

mechanisms for controlling behavior on the commons that "a limit on behavior is pointless unless access is limited first."

¹¹ For the "capitalist" some rents may be used to prevent the enforcement of the *de jure* rights of labor endowed claimants whereas for the labor endowed claimants some rents may be expended to have their *de jure* rights enforced.

¹² See Appendix I for a formalization of this result.

intragroup heterogeneity is larger.¹³ Groups with better collective action will, *ceteris paribus*, have higher probabilities of being favored by the political process.

Lobbying by special interest groups matter but politicians also have to pay heed to the preferences of voters, particularly if the issue is salient and suffrage is universal. Given the centrality of land to production, especially in agricultural and pastoral economies, the property rights to land are an important issue in the utility function of individuals. If the franchise is widely held, e.g. all adult males regardless of land ownership, then we would expect to see the property rights to land favor the small holder.

Finally, we can make inferences regarding the outcomes of the political process by considering even some very general characteristics of that process. The preferences of the central government are naturally key determinants of the outcome. Whether those preferences support the incumbent or the entrant is an important factor, but by no means the sole determinant of the outcome. Where political support favors the first arrival this adds to the “home court” advantage and greatly increases the probability that the early arrivals will stay on the land, to a point where *de jure* property rights might not even strictly be necessary as *de facto* rights are bolstered by both political and physical strength. It is even possible, as we shall see in the Brazilian case, that this situation evolves with the incumbents (large coffee planters) effectively taking over the government. Where the political support at the center supports the newer entrant the final outcome still depends on other factors, such as the size of the “home court” advantage. If the support provided by the central authority is enough to overcome the resistance of the incumbent we will see the specification of *de jure* property rights transferring rights from the incumbent to the entrant. But, in many instances the political will is sufficient to change the *de jure* rights but not enough to implement the enforcement of *de jure* property rights. As such *de facto* rights may determine resource use for a long time, a situation we shall see that prevailed in our U.S. case study for over 50 years. The disjuncture between the specification and enforcement of rights in many instances appears to be the result of the specification being in the hands of a central government while the enforcement is in hands of a local government which is captured by the earlier wealthier arrivals.

In the next sections we analyze the process of the emergence and evolution of property rights for land on the frontiers in Brazil in the 19th century, using the taxonomy and framework above as guides for the analysis. Over time potential or actual disputes arise between entrant groups and there is a demand by claimants for *de jure* property rights to reduce the rent dissipation that emerges from those disputes. This demand is eventually met with a supply of *de jure* property rights which in all three cases involves the central government as the key player and indirectly the interests they represent, which in some cases are the direct contenders and in other cases more diffuse constituencies such as voters. We show how the characteristics of the players, the markets that determine the NPVs, and the nature of the political process determine the property rights that emerge.

III. Settlement of the Brazilian frontier

In 1822, a few weeks before achieving independence from Portugal, the Emperor of Brazil suspended the use of *sesmarias* (large land grants), the main formal means through which

¹³ Ostrom (2009) has argued that in some situations heterogeneity may be beneficial in overcoming the collective action problem of organization. This is also well-known in cartel literature in IO; if there is a member who disproportionately would win from collective action, this player would incur the costs of organizing and sustaining the commons arrangement.

land had been granted since the 16th century, leaving no land law in its place. Over the previous centuries the colony's economy had been through a sugar cycle (1550-1650) and a gold cycle (1700-1780) both predominantly based on slave labor. Although the formal route for access to land had been the *sesmarias*, which were free and readily available to those who owned slaves, land was not scarce and so could easily be squatted on. The suspension of the *sesmarias* was partly a reflection of the abundance of land, particularly in a period (early 19th century) when economic activity was at an all time low (Furtado, 1959). From 1822 to 1850 there were no formal rules regarding the access and use of land and the issue was not even mentioned in the new country's constitution of 1824. After the 1830s, however, the economic viability of coffee started to improve and plantations quickly started to spread, first in the region of Rio de Janeiro and then gradually expanding the frontier south towards São Paulo and eventually westward in the São Paulo interior.

This process of frontier expansion conforms to the dynamics of our model in Section II yet with some idiosyncrasies given the details of the Brazilian economy in the period when the scarcity of land started to kick in. The early entrants were large slave owners (referred to as capital in Section II).¹⁴ Initially landowners imported slaves to use during the sugar and gold booms but these had been under-utilized since the end of the gold cycle in 1780 given the stagnant economy. The slave/landowners were thus willing to engage in the production of coffee even before coffee prices, as well as those of other commodities, started to rise after the 1840s. In a sense the landowners were already on the frontier, though they may not have moved to the frontier given the new relative prices after the sugar and gold booms ended. There were very few small landowners because the Brazilian economy up to that point had offered little return for smallholders who could not afford slaves. Few immigrants were willing to go to Brazil while slavery and large plantations were the norm.¹⁵ In this period there was consequently first person specification and self-enforcement, which due to low scarcity was easily achieved.

As the NPV to land started to rise with the prospect of higher coffee prices and the diffusion of the habit of drinking coffee throughout the world, the demand for land increased leading to a rapidly expanding frontier. With higher NPVs competition for the land increased and two separate problems emerged for the coffee producers. The first problem is that in the absence of any *de jure* rule for allocating land the *de facto* reality had been massive levels of squatting by large landowners covering huge expanses of land that were not actually occupied or used, given the low level of economic activities that had prevailed following the end of the gold cycle. Claims overlapped but this did not lead to conflict while land was beyond the economic frontier—the point that would induce migration.¹⁶ With the rise in NPVs, however, and the prospect of imminent higher returns even from land still beyond the frontier, conflicts erupted, both physical and legal as competing claimants tried to make their claims prevail. Dean (1971: 611) states that during this period “...the landowners hired gunmen killed not only recalcitrant backwoods ‘intruders’, but also other landowners.” Similarly Osório Silva (1996: 133) notes that “..."

¹⁴ Though coffee requires a lot of labor, initially coffee cultivation was performed by slaves, a capital asset from the owners' viewpoint. In addition coffee is between a tree and perennial shrub, lending it more to designation of capital intensive. The relative applications of labor or capital do not affect our analysis of settlement.

¹⁵ It remains as puzzle as to why more immigrants did not migrate to the South of Brazil where the return to self-sufficient farming appeared to be higher than the return that prospective immigrants reaped in Portugal or in many other countries. If it was a capital constraint, what prevented an indenture market from arising?

¹⁶ A similar situation occurred in the Amazon in the 20th century following the collapse of the rubber boom in the early part of the 20th century until the encouragement by government of new entrants in the 1960s and 1970s.

litigation and disputes over boundaries were in the order of the day, being responsible for a great part of the fights among families and crimes in the interior.” The need to hire gunmen and lawyers marks a shift to third party enforcement, while specification was still first party. The costs and rent dissipation generated by such conflicts was one of the sources of a rising demand for formal property rights to land by mid-19th century.

A separate issue which also fueled the demand for a new land law at this time was the pressure by the English for the end of slavery. Brazil had managed to evade earlier attempts by the British to impose this prohibition, but by mid-century it was becoming obvious that the importation of slaves would have to cease in the near future and complete abolition would eventually follow. As coffee production was completely based on slave labor and large plantations, this situation required that a new source of labor, European immigration, be set up to allow a smooth transition. Doing so, however, involved establishing a land law that would assure that the immigrant labor would effectively be directed towards the plantations rather than moving to the frontier to squat on land of their own. Landowners needed to eliminate the availability of free land if they were to retain their privileged position.¹⁷ In other words there was a need to move to third party specification.

In 1850 a new land law (*Lei de Terras N^o 601*) was finally approved and in that same year the transatlantic slave trade officially and effectively ceased. The law had two main provisions: 1) validation with no restrictions on all land claims obtained prior to 1850, whether from *sesmarias* or plain squatting; and 2) purchase was the only legal means of securing additional land. Given that Parliament essentially represented the landed elite the validation of squatting was not contentious.¹⁸ The second measure was less consensual as the landowners in frontier São Paulo regions (represented by the Liberal party) faced plenty of land to be appropriated in the future, while the landowners in the closed Rio de Janeiro frontier (represented by the Conservative party and closer to Emperor) did not have such opportunities. The first pass at approving the law in the early 1840s was blocked by the Liberals coming to power, but upon the Conservative return in 1850 the law was approved imposing the restriction on further squatting. As we shall see the consolidation of the frontier landowners’ power in the second half of the 19th century implied that this restriction was not enforced and land was continuously squatted for decades to come. The inability of the central government to apply the law meant that specification remained in first party hands. The *de jure* stipulation of purchase would come to play an instrumental role in impeding the access to land by immigrant laborers after abolition of slavery in 1888. At that point enforcement and specification would be done by the state governments, but were used primarily in favor of the landowning oligarchies and to stop immigrant labor from having access to land.

The framework in Figure 1 helps to understand the situation described above. The ideal situation for the landowners would have been a continuation of slavery and a land law that did not restrict their expansion into the frontier but simply arbitrated the conflicts among themselves inherent in that expansion. Such a scenario would yield returns along the upper envelope of the

¹⁷ This is a recommendation that had already been made in the Australian context by 19th century British economist E.G. Wakefield, who was often cited in the parliamentary debates throughout the 1840s in Brazil when this issue has hotly debated (Dean, 1971: 613; Osório Silva, 1996: 99; Carvalho, 1988: 86).

¹⁸ Even by the end of the Empire in 1888 only 1.5% of the population had the right to vote. The franchise was limited to men over 25 with “means.” The electorate voted for an electoral college of sorts which then chose the deputies. The emperor chose the senators. Over time power tilted in favor of the landowners in Sao Paulo region and their political representatives

NPV curves, *ABCD*. For the landowners this would be the equivalent of the secure property rights situation. The property rights could even be merely *de facto* as they would be secure because there are no immigrant laborers to compete for land. But with the end of slavery that scenario was no longer available. The alternatives depended on finding a way to successfully substitute immigrants for slaves. If a change in property rights did not emerge that promoted immigration yet kept the immigrants from seeking their own land, then the NPV faced by the landowners would be the lower returns *GLCD*. From the perspective of the landowners this can be thought of as the open access situation with free entrance and dissipated rents. If, however, the land law of 1850 achieved its purpose of forcing immigrants to sell their labor for several years before being able to purchase their own land, the return to the plantation owners would be above the open access situation and below the secure (*de facto*) property rights situation. This would be a return along *FBCD* in Figure 2. We can think of the new land law as a commons arrangement in the sense that the importation of immigrants and their containment as laborers rather than owners was a collective good with severe free-rider problems. In effect this is the outcome that prevailed once slavery was abolished. Although the higher NPVs associated with slavery were no longer attainable, a second-best (from the point of view of the landowners) was achieved through massive immigration, with the free-rider problem solved by having the central and state governments finance and coordinate the immigration process.¹⁹

Immigration did not increase all that dramatically immediately after the passage of the 1850 Land Law. Although the importation of slaves had been forbidden it was clear to landowners that the use of the stock of slaves could be maintained for several decades yet. Given the high returns to coffee production under slavery, the law was not enforced and the frontier continued expanding through further squatting on the frontier. The law required that all landowners demarcate and register their properties so that the State, in principle, could sell the remaining land. In practice landowners did not register their land and either claimed that any subsequent encroachments had been squatted on prior to 1850, and were thus legitimized by the Land Law, or were able to lobby successfully for ever later years as the benchmark for legitimate claims, thus maintaining.

Carvalho (1988: 94) provides a detailed account of how the landowners evaded and ignored all the restrictions from the Land Law that were contrary to their interest. The sale of land, which, according to the Law of 1850, was supposed to finance the immigration effort, was insignificant and when the pressure for the abolition of slavery increased in the 1880s the government had to turn instead to the general budget. The capture of government by landowners intensified after 1889 when Brazil became a republic and state governments received significant power and autonomy.²⁰ Most states adopted land legislation that essentially replicated the 1850

¹⁹ From 1892 to 1930 the revenue from coffee export tax was 50% of the total tax revenue in São Paulo. During this period the expenditures on immigration programs were on average 5.2% of the total tax revenue and 10.5% of coffee tax revenue (data from Holloway, 1980). Therefore it is not the case that the coffee producers were mostly paying for the immigration themselves. According to Carvalho (1988: 100): "Immigration was financed with budgetary resources that subsidized transportation, immigration and colonization companies, as well as farmers and immigrants. The costs were socialized not only among the farmers, but among the taxpaying population through the public budget, both at the central and at the provincial levels."

²⁰ The coffee planters in the São Paulo frontier were major players in the overthrow of the Brazilian throne, together with parts of the army and the urban middle class (Viotti da Costa, 1985). The discontent of planters arose from both the abolition of slavery and the restriction which the Land Law tried to impose on their ability to incorporate new land.

Land Law. Although in *de jure* terms this legislation prohibited further incorporation of land to the private domain through squatting, in practice "... the fundamental characteristic of the legislation approved by the states was the liberality towards the (large) squatters" (Osório Silva, 1996: 255.) It was actually convenient for the local oligarchies to have the law in place for selective use to keep others from access to land. This period can thus be interpreted as a switch to third party specification and enforcement.

By the time that the maintenance of slavery was no longer politically sustainable in the 1880s, the importation of immigrant labor had been effectively organized and the abolition of slavery in 1888 and transition to free labor came about with few tribulations for the coffee planters apart from the unavoidable move to a second-best form of labor. The flow of immigrants in the subsequent decades, especially in São Paulo, the main coffee region, guaranteed a steady availability of labor at low wages (Bazanezi et al., 2008: 92; Hall, 1969; Halloway, 1980).²¹ The period after the proclamation of the republic in 1889 up to 1930 would be the golden age of coffee with ever-expanding planted area and prices kept high by government intervention despite systematic over-production. It is in this period that the landowners faced the biggest threat of entry of immigrant laborers who could potentially squat on marginal land prior to the arrival of the coffee capitalists.

In the Brazilian case the political equilibrium was clearly skewed towards the landowners and the laborers stood very little chance of winning any dispute for land, whether physical or political. Local oligarchies dominated access to land and power in their regions, usually through the figure of the all-powerful *coronel* that presided with feudal-like rights and reigned through a mixture of paternalism and violence, strengthened by his association to central state politicians to whom he could deliver votes.²² Laborers typically lived and worked on large plantations and were even given the right to plant for their own use, but access to land ownership was rarely a possibility. Even if one managed to squat on land in marginal frontier areas, it would typically be difficult to retain the land once the coffee frontier arrived and competing claims (often with questionable titles) by the large landowners emerged (Osório Silva, 1996: 336). Thus in Brazil the 'coronels' effectively preempted the entrants (in Figure 2) and the coffee planters retained strong *de jure* and even stronger *de facto* rights bolstered by their political dominance.²³ This

²¹ Rivera, Nugent and Saddi (2004) argued that land laws evolved through the 1850-1920 period in a way that made property rights more secure as a means to encourage immigration. They create an index of the precision of the law that varies over time and use this in a first-order vector autoregression specification, where the other dependent variable is the annual flow of immigration and the explanatory variables are coffee exports, terms of trade and presence of slaves (dummy). In the equation where the flow of immigrants is the dependent variable they are surprised to find that the lagged total precision of the law has a negative effect on immigration as their story predicted a positive relation. Their result is however perfectly compatible with our analysis where coffee planters use their clout, including politically through the law, to deny access to land for immigrants and other potential smallholders.

²² The key to the power of the *coronels* was the control of the franchise which was not secret. Universal literate male suffrage existed which gave the franchise over time to 6% by the 1920s. Despite the stipulation of literacy *coronels* could deliver the votes of their workers. Workers exchanged their votes as part of the paternalistic package offered by the *coronels*. Many aspects of the rural paternalistic system are similar to what prevailed in the U.S. on large plantations from the 1890s until the mechanization of cotton in the 1960s (Alston and Ferrie, 1993).

²³ Note that although there are not significant economies of scale for growing coffee, the pattern of production was overwhelmingly on large farms. This is evidence of the greater importance of politics as a determinant of

process was not devoid of violent conflict, not only against potential small entrants, but between the different oligarchy/families that disputed not only land but control of municipal power. According to Osório Silva (1996: 263):

... the benevolence of the state's land policies towards the squatters did not imply a democratization of the access to land. ... The essential condition for a squatter to become an owner was to stay on the land that is to be legalized for a sufficiently long time. To stay on the land does not necessarily mean to cultivate it, but rather to stop others from squatting on it and/or avoid being removed from the land by the municipal and state authorities in charge of the public patrimony, who acted with scandalous impartiality. To stay on the land the large farmer/squatter counted on his own resources (armed henchmen) and sought to stay well connected with the state authorities. ... Thus in the long run the little vigilance that the small squatters could muster to try to stay on the land was useless. Their permanence on the land was temporary and unstable; lasting only until stronger forces showed up to kick them out. Osório Silva, 1996: 336-337.

After 1930 Brazil initiated in earnest its industrialization process and a shift of power from rural to urban elites started to take place. By then the extremely concentrated land ownership structure was consolidated. The process of frontier expansion from that time has followed a similar pattern, where land is titled long before it is occupied. The peasants that initially occupy the land are the first stage through which the frontier expands. They are subsequently replaced by large landowners in a process that Foweraker (1981: 10) notes is mediated by law, the bureaucracy and possibly violence.

The slowness and bias of the legal system, and the very concept of 'ownership' of land work against the peasant on the frontier. Legal right to land always belongs with others, and their own 'legal' claims and protests are always invalidated by the mysterious language of the law and bureaucracy. ... (W)here the provisions of the law are incomplete or insufficient, then violence is used to force the peasants from the land, or sever their surplus from them. (Foweraker, 1981: 117)

Only in the 1990s, with the rise of the Landless Peasants Movement (*MST*), did landless peasants begin to master this 'mysterious language' and start to use the law and bureaucracy to achieve access to land through land reform (see Alston, Libecap and Mueller, 1999a,b, 2000, 2008).

VI. Concluding Remarks

In our analytical framework there is a progression of settlement: from squatters, with self-enforcement; to *de facto* commons arrangements; and ultimately to *de jure* titled land. In the Brazilian case the absence of any specified *de jure* property rights by the government enforcement led to *de facto* self-enforced and third party enforced claims, along with sporadic conflicts. The Brazilian case had a high potential for conflict with immigrants but with little conflict actually occurring. Large coffee plantation owners harnessed their political power to

property rights rather than endowments being the primary determinant as in Engerman and Sokoloff (1997). We thank Stephen Haber for pointing this out.

prevent competition over land claims persuading the central and state governments to deny immigrants access to land. The violence advantage of local *coronels* reinforced their political power. In turn, this reduced the potential and actual conflict that may have occurred between the *coronels* and the immigrants. Nevertheless, conflict did erupt periodically among the large coffee planters. Because of the huge gains to claimants from securing land through violence and the absence for many years of any access to *de jure* rights, the large planters only acted collectively in the political arena to exclude outsiders (immigrants), and to legitimate their squatted claims.

More generally the political power of the first claimants tend to influence the supply of formal property rights to their claims. In countries such as Australian and US, which also had extensive frontier processes, where this political power was relatively diluted by the size of the franchise, the supply of *de jure* rights was not in their favor. However, a lack of enforcement of *de jure* rights for entrants resulted in incumbents being able to prevent the initial reallocation attempts by utilizing either a wealth and/or violence advantage. In Brazil the wealth and political advantage of the initial claimants was overwhelmingly stronger than the potential entrants. Our analysis suggests that *de facto* rights tend to prevail for a time even in the presence of *de jure* rights that fail to support them because of the lack of political will to enforce *de jure* rights. Generally, the supply of formal rights to land will be associated with rent dissipation if formal rights do not recognize the status quo *de facto* rights. Rent dissipation took the forms of land use inconsistent with relative prices, political lobbying, violence and threats of violence.

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Appendix 1

In this appendix we show how the magnitude of the NPV associated with having secure private property affects the willingness of claimants to organize, lobby and fight for those rights. Let π^{PP} be the NPV a claimant receives if the land becomes private property. The claimant has some expectation of the probability that his side will win the dispute and get private property. This probability, θ , is a function of the effort, e , his side puts towards lobbying, fighting, rent-seeking, persuading, etc. Thus $\theta(e)$ is the probability the claimants will be granted *de jure* and *de facto* private property.

Assuming that when one group is granted private property the other gets nothing, the expected NPV for a claimant is (let the superscript $i=k, l$ represent capital or labor).

$$E(NPV)^k = \theta(e^i)\pi^{PP,i} \quad (1)$$

$$\text{And the return to effort is: } \frac{\partial E(NPV^i)}{\partial e^i} = \frac{\partial \theta(e^i)}{\partial e^i} \pi^{PP,i} \geq 0 \quad (2)$$

The optimal amount of effort is given by:

$$\text{Max}_{e^i} \theta(e^i)\pi^{PP,i} - C^i(e^i) \quad (3)$$

where $C^i(\cdot)$ is the cost of effort.

This maximization yields the standard result that in equilibrium the marginal benefit of effort equals the marginal cost of effort.

$$\frac{\partial \theta(e^i)}{\partial e^i} \pi^{PP,i} = \frac{\partial C^i(e^i)}{\partial e^i} \quad (4)$$

This expression can be used to determine the effect of a change of the value of land under private property on claimant i 's optimal effort?

$$\frac{\partial e^i}{\partial \pi^{PP,i}} = \frac{\frac{\partial \theta(e^i)}{\partial e^i}}{\pi^{PP,i} \frac{\partial^2 \theta(e^i)}{\partial e^i \partial e^i} + \frac{\partial^2 C^i(e^i)}{\partial e^i \partial e^i}} > 0 \quad (5)$$

This is positive as the denominator is the second order condition of the maximization problem and is negative. This means that the greater the total value of the land under private property, that type of claimant will put in effort towards assuring those rights, which is what we set out to show.

One could argue, however, that to be more accurate the analysis should include the fact that when deciding the optimal amount of effort each group of claimants would take into account the other side's reactions in Cournot fashion. Repeating the exercise above but allowing each sides' perceived probability of getting the private property to be $\theta^i(e^i, e^{-i})$ where $-i$ refers to the other group, the comparative static result becomes:

$$\frac{\partial e^i}{\partial \pi^{PP,i}} = \frac{-\frac{\partial \theta^i(e^i, e^{-i})}{\partial e^i} * SOC^{-i} + \frac{\partial \theta^{-i}(e^i, e^{-i})}{\partial e^{-i}} \pi^{PP,i} \frac{\partial^2 \theta^i(e^i, e^{-i})}{\partial e^i \partial e^{-i}}}{|\det|} \quad (6)$$

Given that $SOC^{-i} < 0$ it can be shown that $|\det| > 0$ and the final expression is positive if $\frac{\partial^2 \theta^i(e^i, e^{-i})}{\partial e^i \partial e^{-i}}$ is not very large. That is, unless the political equilibrium is particularly lopsided even with strategic interaction among the types of claimants, an increase in the value of the land with private property rights will lead to an increase in the effort of that group.