

# Communal Violence and Property Rights

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## Abstract

We examine the interactions of non-state actors (specifically pastoralists and farmers) when state provided property-rights protection (PRP) is neither perfect nor absent. PRP is modeled as potentially biased towards one interpretation of property rights over another interpretation. Using a contest success function model, we demonstrate that the following non-monotonic result exists. If a society has a moderate level of PRP but some degree of bias away from equity, increasing PRP can result in either a decrease or an increase in total appropriative effort. Thus, simply increasing PRP without addressing equity issues can increase the level of conflict in the society.

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Conflict between herders and farmers dates back to the dawn of history. Herodotus writing in the Fourth Century B.C. in Ancient Greece described Sythian nomadic depredations. Even earlier conflict is recorded in Ancient Mesopotamia (Lawrence A. Kuznar & Robert Sedlmeyer 2005). The endless struggles between the nomadic Bedouin and the fellahin (or peasants) of Arab societies have shaped the history of the Mideast (T. Lynn Smith 1969). Much of rural Sub-Saharan Africa experiences such conflict today, from Namibia, to Tanzania, to Burkina Faso, to the Sudan (Bill Derman, Rie Odgaard & Espen Sjaastad 2007). Indeed, an important element of the conflict in Dafur is one between pastoralists and sedentary agriculturalists (Kuznar & Sedlmeyer 2005). The essential problem is that pastoralists require access to relatively large areas of land and tend to move their herds according to the seasons, ecology and weather changes. Such activities almost inevitably mean that they and sedentary agriculturalists come into competition over land and water. It is this competition that serves as the basis for armed violence between different communities.

Today in East Africa and the Sahel, in Kenya, Tanzania, and Sudan, as well as Mali, Niger, and the Ivory Coast, violent low-intensity conflict occurs with regularity (Matthew D. Turner 2004, Tor A. Benjaminsen & Boubacar Ba 2009). Violence typically erupts as herders move their cattle into areas predominated by farmers. The farmers complain of trampled or eaten crops. The herders express frustration with fenced off land and watering holes drained for irrigation. The sequence of events that precipitate the violence varies. It may be herders retaliating after farmers seize some of the trespassing cattle, or it may be farmers defending their land against encroachment. Typically, though, the violence comes after a long history of conflict and escalating disputes over rights of access to water or land.

The role of property rights (particularly with regard to land and water) is pivotal to understanding such conflict. The conflict between the homesteaders (sedentary agriculturalists) and the cattlemen (pastoralists) in the 19th Century American West is exemplary. This was not an ethnic conflict, but one of contested notions of property. It was a conflict over access to open range land versus staked out claims of private property. It was also a contest for support from the government, for state protection of two fundamentally different notions of property and land use. We shall return to this case after we present our model of bias and property rights protection.

Several different literatures are relevant to farmer-herder violence. Advocates of the perspectives of “environmental security” and “common property management” argue that farmer-herder conflict results essentially from a contest over scarce resources (Thomas F. Homer-Dixon 1994, Thomas Homer-Dixon 1999, Günther Baechler 1999, Colin Kahl 2006). For this group, there is an inevitability to such conflict. In contrast are those who contend that the way to address such conflict is to work to strengthen property rights protection and to increase the role and penetration of the state (Douglass C. North 1990, Stephen Knack 2003). This, indeed, is the policy response recommended by such organizations as the World Bank. In a third literature, political ecologists maintain more multidimensional, complex views about the genesis of such conflict (Douglas Johnson & David M. Anderson 1988, David M. Anderson 2002, Turner 2004, Tor A. Benjaminsen, Faustin P. Maganga & Jumanne Moshi Abdallah 2009). The perspective taken in this paper lies closer to that of the political ecologists. By focusing on property rights protection and state bias in affording this protection, this paper illuminates the complex relationships between political interests and resource access that underlie these conflicts.

The concept of bias in property rights protection constitutes a central place in our argument. In terms of pastoralist-sedentary agriculturalist violence, given the tremendous differences in conceptions of property in these two forms of agricultural production, the state is often biased in one way or another. Property laws in particular grant title to land rather than the traditional notion of entitlement to use the land but not to own it per se. Pastoralists are particularly disadvantaged by this conceptualization of property rights, which strongly favors sedentary farmers with set plots of land on which they grow crops as opposed to the open rangeland grazing of pastoralists. The typical pattern has been one in which the customary pastoral leaders have gradually lost power and wealth to the benefit of previously underprivileged farmers (Benjaminsen, Maganga & Abdallah 2009).<sup>1</sup> Sedentary agriculture is typically viewed as more modern and granted a privileged status. Enforcement of property rights need not be biased, but it usually is. Drought may further

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<sup>1</sup>Property rights bias can also occur between pastoralist groups when, for example, territory is divided between groups granting exclusive rights to one particular group, excluding others from grazing or water-hole rights.

aggravate land disputes as pastoral groups are more likely to move their herds into farming zones.

Focusing on non-state-actor violence or communal violence, this paper features the role of property rights protection and the bias in this protection. Using a competitive appropriation model (Jack Hirshleifer 2001, for example) with an exogenous but potentially biased level of property rights protection, we demonstrate how bias combined with high levels of property-rights protection can be just as conflictive as a situation with low levels of property-rights enforcement. Thus, for cases of low bias, increasing property rights protection should indeed decrease the likelihood of communal violence. For cases of high bias, however, communal violence will be lowest for moderate levels of state protection of property rights but will be high for either low or high levels of state enforcement of property rights. We further argue that because increasing state strength has been associated with liberal democracy in the modern era, state strength is correlated with more equal societies. This has tended to obscure evidence of an otherwise intuitive argument that equity is also important to peace. As developing states are pressed to strengthen property rights institutions, however, we must be concerned that equity is also addressed.

Substantively, this paper features armed conflict between pastoral or nomadic peoples and sedentary agriculturalists or farmers. We develop a generalized model of property rights and conflict and then explicate the model by applying it to particular cases of violent conflict between herders and farmers. The first case is the Kilosa Killings of December 2008 in Tanzania, between Maasai herders and farmers (composed a variety of ethnic groups). The second case is the Johnson County Range War of 1892 in the Great Plains of Wyoming, between cattlemen and homesteaders.

## 1 Modeling Property Rights and Conflict

We analyze communal violence through the development of a contest success function model. Contest success functions (CSFs) offer a flexible way to model the dynamics of conflict. CSFs are economic models of conflict. Rather than featuring only the technologies of production as most other economic models do, they also incorporate the technologies of appropriation and war. “There are ways of tilling the land and quite a different set of ways of capturing land and securing it against intruders” (Jack Hirshleifer 1995, Hirshleifer 2001, 104). CSFs allow us to model both aspects of an economy, the productive and the predatory. In an environment of a weak or fragile state, contracts are weakly enforced. Property rights, in particular, tend to be weakly enforced at best. The institutions that serve to regulate the economy work inefficiently and perform even more poorly when violence is endemic. Consequently, conventional models of economic production fail to model accurately the political-economy of non-state-actor conflict. Indeed, the original idea of a CSF is that actors choose how they are going to allocate their individual resources in the total absence of property rights. Resources can be allocated either into production or appropriation. The allocation of this wealth is what turns money into guns (for appropriation) or butter (production). In this respect, the CSF modeling approach offers an effective way to model pastoralist-sedentary agriculturalist conflict.

Conventional production models assume perfect property rights and enforceability of contracts. Hirshleifer purposely examines the “dark side” of economic activity in which the opposite is true on both counts in an environment of anarchy. The two types of model are at opposite ends of an institutional spectrum. The typical production model assumes a functioning legal system. Contest Success Function models often presume anarchy.<sup>2</sup> Part of our purpose here is to examine the full range of institutional possibilities. Rather than the stark contrast of binding, enforceable contracts versus the complete absence of moderating institutions, we examine interactions of non-state actors under the imperfect gaze of the state. State institutions are neither perfect nor absent. Instead, we examine how the biases inherent in state institutions and their relative strength can be significant factors accounting for the level of conflict between non-state actors.

### 1.1 Assumptions

To study the effects of property rights on communal violence, we make several simplifying assumptions. First, we assume there are only two groups which may represent different families, clans, or ethnic communities.

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<sup>2</sup>See Skaperdas (1992; 2008) in particular.

These two groups rely on land for their livelihoods, whether for farming or grazing. This is not that heroic of an assumption. Most communal conflicts involve two groups. When there are more than two groups, alliances form. This was evident in the American West where sheep herders, small holding cattlemen (possessing relatively small ranches but owned as private property) and homesteaders were allied against the free-range cattlemen. In African range wars, sedentary farmers of different ethnic origins typically are pitted against a single pastoralist group (Benjaminsen, Maganga & Abdallah 2009).

The division or access to land for each group is a key variable in our model. It may be that there is a clear boundary that is strictly enforced, or the boundary may be clear but there is no effective enforcement. Alternatively, there may be no clear boundary but rather a genuine communal plot that is shared between the groups. Or, as is often the case in pastoralist-sedentary agriculturalist conflict, one group regards land as a private good (excludable and rival), which can be divided piecemeal and the other regards the good as communal property (non-excludable, yet rival). Even in this case, however, we assume that there exist norms of how much each group will get come harvest/roundup time and that these norms have a varying level of enforcement. In short, we assume that there is some expectation of how the productivity of the land will be divided if there is no conflict and that this expected division is enforced by some external source but that the level of enforcement can be at any level from perfectly enforceable contracts to no enforcement whatsoever.

We recognize that the technology of production may well be related to the level of enforcement or expectations of division. For agriculturalists, parceling of land into private lots sets clear expectations for division of the harvest and a sense that land and its produce is excludable and rival. For pastoralists, there may be greater variance in the expectation of division precisely because the land is not seen as excludable though it remains rival. Even so, non-excludability is never perfect. Though fences may make good neighbors, they do not absolutely guarantee that your neighbor cannot steal some cabbages in the middle of the night.

With this set-up we feature two very different conceptions of property. The sedentary-agriculturalist perspective dominates most Western European or North American notions of property – land is property which is divided between households. For pastoralists, property is cattle, whether an American cattleman from the 19th Century or a Maasai herder. The land is common property open to the herds.

Given this environment, our two groups make decisions regarding how much to invest in the productivity of the land and how much to invest in appropriation. In particular, we model how much effort each group puts into taking from the other group. The effort put into such appropriation is assumed to detract from the overall productivity of the land. The question we pose is how the expected division of productivity and its level of enforcement affect the levels of appropriation from each group. This appropriation is presumed to be a form of violence.

## 1.2 Model

We answer our question theoretically through the use of a contest success function (CSF). CSFs have been used by others to model many aspects of conflict. Our model has several assumptions common with other CSFs. Each group optimizes its welfare given the anticipated behavior of the other group. Each group has some initial resources ( $R_i > 0$ ) that are then allocated into productive and appropriative effort. The appropriative effort is conceptualized as fighting effort,  $F_i \in [0, R_i]$ . In the absence of enforceable contracts, all productive effort is assumed to create a collective income ( $I$ ) that is divided between the two groups according to their appropriative effort. Collective income is assumed (for simplicity) to be the sum of productive effort.

$$I = (R_i - F_i) + (R_j - F_j) \tag{1}$$

To examine the problem of pastoral-agrarian conflict, we adopt a modified version of a CSF first presented by Neary (1997). The proportion of collective income that group  $i$  gets ( $p_i$ ) is a function of its fighting effort divided by the total fighting effort of both groups. The  $\eta$  terms (assumed to be strictly positive and non-zero) allow for definition of this function when fighting effort is zero.<sup>3</sup> We conceptualize  $\eta$  as the enforcement of

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<sup>3</sup>This alters Neary's (1997) CSF by subscripting the  $\eta$  terms. Also, there is usually a "military decisiveness" parameter

property rights. It is through these additional terms that we will analyze property rights and bias later in the paper.

$$p_i = \frac{F_i + \eta_i}{(F_i + \eta_i) + (F_j + \eta_j)} \quad (2)$$

Given this division mechanism, each group maximizes its share of the collective income ( $I_i = p_i I$ ).

$$I_i = \frac{F_i + \eta_i}{(F_i + \eta_i) + (F_j + \eta_j)} [(R_i - F_i) + (R_j - F_j)] \quad (3)$$

When  $\eta_i = \eta_j$  and neither actor invests in fighting effort, collective income is divided equally (i.e.,  $p_i = 0.5$ ). Neary (1997) examined how an unequal distribution of resources ( $R_i \neq R_j$ ) affects allocation decisions while essentially setting  $\eta_i = \eta_j$ . The main effect of property rights protection, the  $\eta$  term, in this case is to create a drag on what fighting effort can get you as  $\eta$  increases (Hugh N. Neary 1997, p.492). He found that there are only four possible equilibrium outcomes: 1) communal, in which neither party invests in guns; 2) Hobbesian, in which both parties invest in guns; 3) suzerainty, in which the more wealthy player divides his resources between productive and predatory investments while the less wealthy player puts all of his resources in productive investments; and 4) banditry, in which again the more wealthy player divides his resources between productive and predatory investments while the less wealthy player invests all of his resources in arms. Neary argues that these four equilibria “exhaust the possibilities of the model” (1997: 493).

But there may be any number of reasons for collective income being divided unequally *without* conflict. Consider two families each farming a communal plot. One family has ten members while the other has four. Assuming everyone works equally, then one fair division would entail each individual getting an equal share of the harvest. Thus, the larger family would get more than the smaller family.

We argue more generally that in situations of no conflict, the division of income would be premised on an expected division of collective income based on boundaries or norms. In this regard, the ratio  $\eta_i/(\eta_i + \eta_j)$  can be interpreted as the no-conflict division to group  $i$  when  $F_i = F_j = 0$ . This no-conflict division is offset in practise by investments in fighting effort.

### 1.3 Model Analysis

Both groups are assumed to make their allocation decisions simultaneously. Group  $i$ 's reaction curve is found by taking the derivative of (3) with respect to  $F_i$  and then solving for  $F_i$ .

$$F_i = \sqrt{(F_j + \eta_j)(R_i + R_j + \eta_i + \eta_j)} - F_j - \eta_i - \eta_j \quad (4)$$

Group  $j$ 's reaction curve is found by the same process. Substituting group  $j$ 's reaction curve into (4) and solving for  $F_i$  again, we find group  $i$ 's equilibrium level of fighting effort as a function of initial resources and property rights enforcement, the  $\eta$  terms. This holds so long as the joint equilibrium is an interior solution (in which both groups invest in some fighting effort, but less than their resource allocation). If  $F_i^*$  and  $F_j^*$  is jointly an interior solution (i.e.,  $F_i^* \in (0, R_i)$  and  $F_j^* \in (0, R_j)$ ), then

$$F_i^* = \frac{(R_i + R_j - 3\eta_i + \eta_j)}{4} \quad (5)$$

$$F_j^* = \frac{(R_i + R_j - 3\eta_j + \eta_i)}{4} \quad (6)$$

From this we derive our first three propositions. The first proposition capitalizes on the fact that the equilibrium fighting efforts both have  $R_i + R_j$  in the numerator.

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included in such CSFs as an exponent on each fighting effort parameter. As the effects of this parameter are not a focal concern and add considerable complexity to the mathematics, we assume that this parameter is unity throughout.

**Proposition 1** *As total resources rise, ceteris paribus,  $F_i^*$  and  $F_j^*$  both increase.*

The implication of this proposition is that as the total resources of a society increase *without* attendant increases in enforcement (represented by the  $\eta$  terms), total conflict should be expected to increase, given only positive values to  $R$ . This result runs counter to some of the case study work that links scarcity and conflict,<sup>4</sup> but is supported by the detailed large-N analyses of communal conflict in Kenya by Witsenburg and Roba (2007) and Witsenburg and Adano (2009); they find that scarcity induces cooperation rather than conflict. Our result also finds support among scholars of the political ecology school.<sup>5</sup> The result also reflects the central argument of the resource curse – that “honeypots” without institutional regulation will attract conflict (Indra de Soysa 2002). The next two propositions examine the relationship between the  $\eta$  terms and equilibrium fighting effort.

**Proposition 2** *Increases in the other’s protection ( $\eta_j$ ) increase one’s own fighting effort ( $F_i^*$ ).*

**Proposition 3** *Increases in one’s own protection ( $\eta_i$ ) decrease one’s own fighting effort ( $F_i^*$ ) to a greater extent than it increases the fighting effort of the other group ( $F_j^*$ ).*

An implication of Proposition 3, in particular, is that if one group has a high enough level of protection compared to the other group, then the equilibrium given by (5) and (6) would no longer be an interior solution. If we do not have an interior solution, then we must consider what  $F_i^*$  looks like when  $F_j$  is at one extreme or the other. When  $F_j^* = 0$ , group  $i$ ’s equilibrium fighting effort is found by substituting that value into (4). This is given by (7).

$$F_i^* = \sqrt{(\eta_j)}\sqrt{(R_i + R_j + \eta_i + \eta_j)} - \eta_i - \eta_j \quad (7)$$

At the other extreme, one group may have fighting effort equal to its initial endowment. This can occur when its resources are low and its level of protection is also low. When group  $j$  has this extreme level of equilibrium fighting effort, group  $i$ ’s equilibrium fighting effort is found by substituting  $F_j^* = R_j$  into (4). This is given by (8).<sup>6</sup>

$$F_i^* = \sqrt{(R_i + R_j + \eta_i + \eta_j)}\sqrt{(R_j + \eta_j)} - R_j - \eta_i - \eta_j \quad (8)$$

While the  $\eta$  parameters allow for some interpretation, we argue here that two different parameters help us make more sense of these results, particularly equations (5), (6), and (7). To do so, we return to (3) and recall that the ratio  $\eta_i/(\eta_i + \eta_j)$  represents the proportion of collective income that group  $i$  gets in the absence of conflict (i.e., zero total fighting effort). This is also the relative ratio of property rights protection. If this ratio equals 0.50, then each group gets an equal proportion and there is no bias in the no-conflict outcome. This is the scenario examined by Neary (1997). However, the ratio can also be tilted in favor of or against group  $i$ , representing a kind of “institutional bias” in the no-conflict outcome. Hence, we define a bias parameter,  $\beta_i$ , as identical to this ratio. In addition, we will use the identity  $(1 - \beta_i) = \eta_j/(\eta_i + \eta_j)$  in other substitutions.

Neary notes (1997: 492) that the  $\eta$  terms in the denominator had the effect of reducing equilibrium fighting effort. We define  $\rho = \eta_i + \eta_j$  and interpret this parameter as the strength of property rights protection. Note, therefore, that  $\eta_i = \rho\beta_i$  and that  $\eta_j = \rho(1 - \beta_i)$ . We further simplify the model in this paper by assuming that  $R_i + R_j = 1$  and that the difference between  $R_i$  and  $R_j$  is not so great that equation (8) is operative. We do examine circumstances where one group has zero equilibrium fighting effort. In combination, this allows us to examine the combined effect of institutional bias and property rights protection on the total level of fighting effort between our two groups.

<sup>4</sup>See for example, Homer-Dixon (1999) and Kahl (2006). These types of case studies, however, have been criticized on grounds of methodological and research design flaws (Nils Petter Gleditsch 1998, Nils Petter Gleditsch 2001, Bjorn Lomborg 2001).

<sup>5</sup>See in particular Turner (2004) and Benjaminsen et al. (2009).

<sup>6</sup>While it makes sense that a group will fight because it is in such dire straits, our analysis of institutional bias and property rights protection does not rely on (8).

Using parameters for institutional bias and property rights protection, transforming (5) and (6), and adding them together to find total communal violence ( $TCV = F_i^* + F_j^*$ ), we find the usual main effect (given by equation (9)) that is summarized in Proposition 4.

$$TCV = \frac{1 - \rho}{2} \quad (9)$$

**Proposition 4** *If the solution is an interior one, then increasing property rights protection reduces total communal violence.*

**Corollary 5** *If the solution is an interior one, institutional bias does not have an independent effect on total communal violence.*

As we noted in discussing Propositions 2 and 3, if institutional bias is great enough, then the group with greater protection does not invest in fighting effort while the other group *increases* its own fighting effort. This occurs when institutional bias is sufficiently high or sufficiently low. Total communal violence in these cases is given by equations (10) and (11).

$$TCV = \sqrt{(1 + \rho)}\sqrt{(\beta_i \rho)} - \rho, \text{ if } \beta_i \geq \frac{\rho + 1}{4\rho} \quad (10)$$

$$TCV = \sqrt{(1 + \rho)}\sqrt{(\rho(1 - \beta_i))} - \rho, \text{ if } \beta_i \leq \frac{3\rho - 1}{4\rho} \quad (11)$$

**Proposition 6** *When property rights protection is sufficiently high and institutional bias is sufficiently extreme, increasing property rights protection or moving to more extreme values of institutional bias increases total communal violence.*

Corollary 5 and Proposition 6 are important in the following ways. When (9) holds, changing  $\beta_i$  has no effect on TCV. This follows from Proposition 4. When (10) is operative, increasing  $\beta_i$  for a given level of  $\rho$  increases TCV; when (11) is operative, decreasing  $\beta_i$  for a given level of  $\rho$  increases TCV.

Taking these last three equations together gives us a topography of total communal violence for different combinations of institutional bias and of property rights protection. A visualization of this is provided in Figure 1.

In Figure 1, the  $z$  axis is  $TCV$  (Total Communal Violence), the axis on the left is property rights protection ( $PRP$  or  $\rho$ ), and the axis on the right is institutional bias in property rights protection ( $Bias$  or  $\beta_i$ ). Note that the  $\rho$  axis is reversed from usual so that the topography of the figure is easier to see. (Figure 1 is rotated such that the origin (0, 0, 0) is in the lower right corner. The  $\beta_i$  ( $Bias$ ) axis is also reversed but the figure is symmetrical with respect to the plane  $\beta_i = 0.5$ ) The figure clearly depicts the non-monotonicity associated with increasing property rights protection. When property rights protection is sufficiently low (at the back of the figure), the marginal effect of increasing property rights protection is to reduce  $TCV$  (Total Communal Violence) *regardless of the level of institutional bias present in the society*. Beyond a critical value of property rights protection, however, further increases in property rights protection can reduce or increase  $TCV$  depending on the level of institutional bias and the magnitude of the property rights protection increase. If institutional bias is moderate, increases in property rights protection are likely to produce a further decrease in  $TCV$ . If institutional bias is extreme, however, increases in property rights protection produce an *increase* in  $TCV$ . Note that if the nature of the change in property rights regime is to increase property rights protection while simultaneously shifting institutional bias toward equity,  $TCV$  is likely to decrease.

## 2 African Range Wars – The Kilosa Killings in Tanzania

Farmer-herder conflict still occurs throughout the world. The threat of violence may have disappeared over reindeer herder rights in Finnmark in northern Norway or in Inner Mongolia (?), but conflict over property

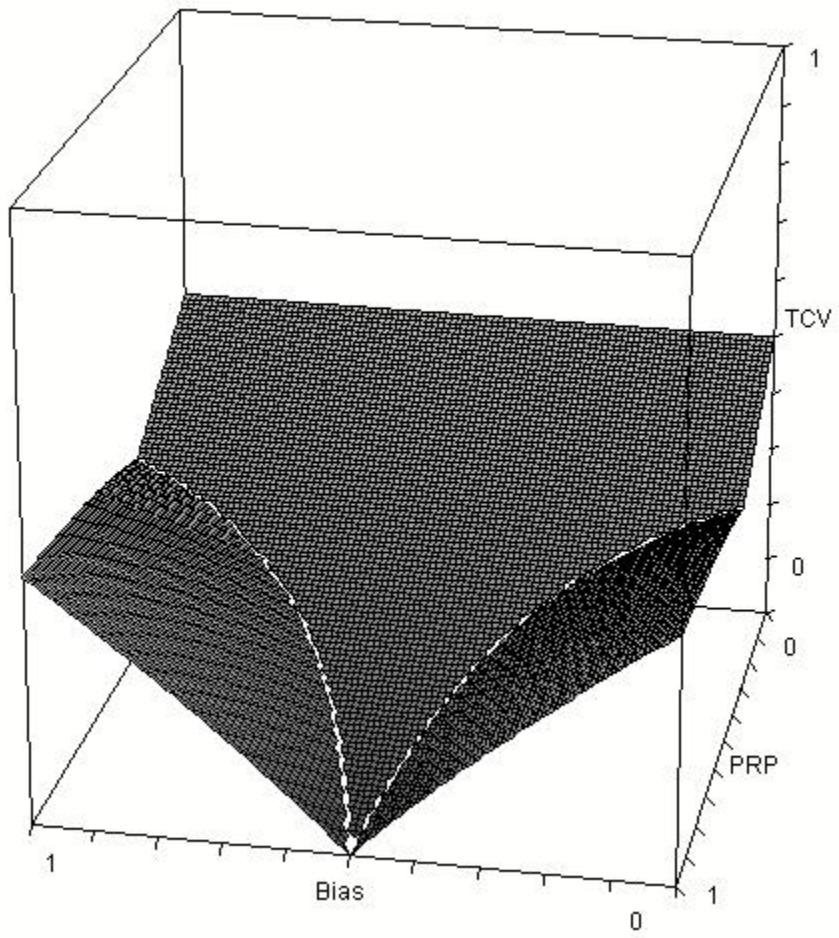


Figure 1: Total communal violence given  $\rho$  and  $\beta_i$



rights persists. Indeed, in China, Mongolian herders have been forcibly relocated to villages and towns and to a sedentary life. In parts of Africa where the reach of the state is limited, communal violence between pastoral and agriculturalist peoples is ubiquitous. Deaths associated with such violence occur with regularity in Cameroon (Mark Moritz 2006), Ethiopia (Tobias Hagmann & Alemmaya Mulugeta 2008), Ghana (Steve Tonah 2003), the Ivory Coast (Thomas J. Bassett 1988, Tonah 2003), Kenya (Karen Witsenburg & Adano Wario Roba 2007, Karen M. Witsenburg & Wario R. Adano 2009), Dafur (?), Mali (Tor A. Benjaminsen & Espen Sjaastad 2008, Benjaminsen & Ba 2009, ?), Niger (Turner 2004), and northern Nigeria (A. U. Ofuoku & B. I. Isife 2009) to name but a few. Turner (2004) provides a good summary of the political ecology approach as applied to farmer-herder violence throughout the Sahel.

In this section, we focus on one particular violent case of violence between pastoralists and agriculturalists in Tanzania with a general discussion of similar conflict in other areas of Africa. We focus in particular on an incident known as the “Kilosa Killings” (Benjaminsen, Maganga & Abdallah 2009). As in other areas of Africa, relationships between pastoral and sedentary agriculturalist peoples in Tanzania appear to oscillate between periods of communal warfare and peaceful coexistence. Nonetheless, communal farmer-herder violence is purported to be increasing in frequency in Tanzania (Benjaminsen, Maganga & Abdallah 2009) and in Africa in general (Turner 2004, Moritz 2006). We draw our case study primarily from Benjaminsen and his coauthors (2009) with some reference to supplementary material.

As with the Johnson County War, which we discuss in the next section, the Kilosa Killings constitutes a single violent event in the broader context of an on-going conflict. Like the Johnson County War, the incident in Kilosa resulted in a outburst of violence between a pastoral militia and agriculturalist villagers. Also, as the homesteading policy underlay the farmer-herder conflicts in the American West, the Tanzanian villagization policies of the 1960s and 1970s underlie these conflicts. Unlike the march on Buffalo, Wyoming, the killings in Kilosa probably do not constitute the culmination of the conflict. Also unlike the American case, the Tanzanian farmer-herder conflicts involve different ethnic groups.<sup>7</sup> In Kilosa, the conflict transpires between the pastoral Parakuyo Maasai and the multi-ethnic sedentary villagers (primarily Kaguru).

Villagization in Tanzania (or *Ujamaa*) has indelibly altered settlement patterns and exasperated farmer-herder conflict. (A similar pattern will be clear in the next section with regard to the homesteading policies of the United States.) Villagization has been designed to end the nomadic life of the Maasai and other nomadic peoples, underlying a broader narrative of “modernizing” agriculture. More particularly, villagization has been composed of two policies, *Ujamaa* and *emparnat*. First introduced in the late 1970s, *Emparnat* means “permanent habitation” in Maa and it is based on the idea of permanently settling all pastoral people. In Kilosa, the Parakuyo Maasai have been settled in a pastoral village, Twatwatwa, with range lands located not too far outside a farmer village (Rudewa Mbuyuni). Maasai first began to be settled in Twatwatwa in the early 1960s, which was registered as an independent village in 1977 (Benjaminsen, Maganga & Abdallah 2009, p. 436). Despite the designation of special pastoral villages and associated with special pastoral lands, farmer-herder conflicts have persisted, primarily because the land areas allocated to the pastoralists are not large enough, leading herders to move their cattle outside the pastoral village areas in search of pasture and water. Maasai livestock have encroached on farming areas destroying the farmers’ crops.

Over the course of the year 2000, the frequency of such incidents increased. Farmers reported damage to their crops to the local authorities but had not been compensated. On several occasions, violence ensued and people were injured from spears and *pangas* (a type of machete). As the frequency of altercations increased, the farmers formed a militia known as the *Sungusungu*. Their role was to catch the trespassing cattle and take the animals to the police. Maasai youth responded by snatching back the captured livestock. This, in turn, led the farmers to begin to carry guns or traditional weapons when out in the fields. Events heated up on 5 December 2000, when some Maasai youth took a cow belonging to a farmer. Later that evening, according to the Maasai version of events (as reported by the transcribed interviews of Maasai elders in Benjaminsen et al. (2009)), a group of *Sungusungu* came into the pastoral village and started to beat Maasai and burned down some houses. The Maasai warriors (the *morans*) met that night to plot their revenge.

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<sup>7</sup>The ethnic composition of the Kilosa district of Tanzania includes the farming Kaguru, Sagara, Vidunda, Gogo, and Sukuma, and the pastoral Barabaig and Parakuyo Maasai (Benjaminsen, Maganga & Abdallah 2009, p. 428). The Gogo traditionally were pastoralist but are generally sedentary agriculturalists now. It should also be noted that while the farmers tend to unite against the herders, the Maasai and Barabaig are traditional rivals.

On 8 December 2000, Maasai *morans* attacked the farmer village of Rudewa Mbuyuni, using guns, spears, bow and arrows, and *pangas*. Thirty-eight villagers were killed and many others wounded. A number of Maasai elders and warriors were subsequently arrested. In addition, some local civil servants, such as the Kilosa District Commissioner, lost their jobs or were demoted, such as the Police Commander of the district. None of the *Sungusungu* (nor any other farmers) were arrested.

The Kilosa killings began with incidents of cattle rustling. But at root, the conflict in Kilosa, like the Johnson County War, was about property rights. As noted by Benjaminsen et al. (2009, p. 431): “Two causes of these conflicts are, first, that the land areas allocated to the pastoralists are not large enough, leading herders to search for pasture and water outside pastoral village areas; and, second, that cultivated areas in wetlands have been extended.” In other words, both groups are moving outside their assigned zones, competing over land use and access to water.

Serving as a backdrop to this conflict is the changing property law in Tanzania. Two new laws were introduced a year before the Kilosa Killings: the Land Act of 1999 and the Village Land Act of 1999. These laws distinguish between General Land, Reserve Land, and Village Land. Kilosa land is divided between all three categories, and in many instances of conflict or contestation, jurisdiction is unclear. In the case of Village Land, the village councils are the administrative authority who operate in accordance with customary law (?). General Land issues are governed by the Commissioner for Land. Privatization of the former sisal estates has compounded this jurisdictional ambiguity. As noted by Benjaminsen et al (2009, p. 439): “A key factor in the conflict that led to the killings is a border dispute ... between these two communities. The pastoralists argue that farmers are extending their irrigated fields into the wetlands that lie on the Twatwatwa land, and the farmers hold that herders let their livestock graze in their fields. While the pastoral community has access to a long stretch of the Wami and Mkata rivers, the contested wetland is the nearest floodplain.”

Tanzania has long held a set of policies biased against pastoralism. In other parts of Tanzania, pastoralists are being forcibly removed from the Usanga Plains and the Ihefu Wetlands by the military (*Dar es Salaam's The Guardian*, 26 June 2006 and 5 April 2007). The dominant discourse throughout most of Africa is that pastoralism is unproductive and environmentally degrading. Pastoralists are told to reduce their stocks, while farmers are encouraged to expand the area cultivated to increase food production (Daniel Kyaruzi Ndagala 1990). President Jakaya Kikwete himself proclaimed that “We have to do away with archaic ways of livestock farming” (A.Z. Mattee & M. Shem 2006, p. 4). Moreover, “in Kilosa, local politicians and administrators are clearly on the farmers’ side in the on-going farmer-herder conflicts” (Benjaminsen et al. 2009, p. 440).

The case of the conflict between the Maasai herders and the farmers in Kilosa relates to several of our propositions. Both the pastoralists and the sedentary agriculturalists engaged in fighting to some degree, implying an “interior solution”. Neither party devoted their resources wholly to fighting. Corollary 5 and Proposition 6 appear to be supported in this case. The conflict was engendered by the villagization policy and changing land laws.

### 3 American Range Wars – The Johnson County War

The “Johnson County War” in Wyoming in 1892 in many ways constitutes the culmination of the conflict between the cattlemen and the homesteaders in the old American West. In the late 1880s, a group of fifty prominent cattlemen (members of the Wyoming Stock Growers Association [WSGA]) organized an armed militia with the stated purpose of clearing the area of rustlers, but it was also designed to protect the cattlemen’s access to the open range and to intimidate homesteading farmers who were fencing off the land. They also engaged in an extensive political lobbying effort to end US homesteading policy, whereby public land was granted to homesteading farmers (Randy McFerrin & Douglas Wills 2007). The “war” came to a head on 6 April 1892 when the militia set out from Cheyenne and began its march on Buffalo, the seat of Johnson County in northern Wyoming. Along the way they stopped at some ranches, killing homesteaders accused of rustling. Word eventually reached Buffalo and the sheriff rounded up a posse of 200 men that soon encountered the WSGA militia. A big shoot-out between the stockmen’s militia and homesteaders

plus the posse ensued. The fighting ended when the US troops from nearby Fort McKinney intervened and arrested the WSGA militiamen. Among those arrested were many prominent Wyoming politicians, including a State Senator, a US Marshall and a Water Commissioner (*New York Times*, 14 April 1892)?.<sup>8</sup> We highlight this case of pastoral-sedentary agricultural violence because ethnicity played no role in the violence. The dominant ethnic group constituting both sides was Anglo-Saxon Protestant native-born American. The conflict was exclusively over property rights.

The conflict in Wyoming and much of the American West more generally was precipitated by the US Federal government's policy of homesteading, whereby government land that had been used as open grazing land by the cattlemen was given to homesteaders to convert to farms (Douglas W. Allen 1991, McFerrin & Wills 2007, p. 72). Up until the 1880s the range cattle industry was dominant in Wyoming and most of the American West. Cattle were grazed communally on the public range. User rights were based on a set of informal norms. Despite their informality, these range rights were robust enough to be bought and sold (Terry L. Anderson & Peter J. Hill 1975, McFerrin & Wills 2007). As such, there was a market for access to range lands. This market depended on a particular area being rival in its usage for a given season and on a tacit excludability.

The nature of homesteading inherently conflicts with the notion of an open communal range. A claim is staked. Land is fenced off. Property is private, explicitly excludable and rival. Most of the discourse around property rights presumes this definition of property. Such a definition, however, is actually an expression of a bias in interpretation of property rights. Communal property is still property and it was governed by a set of rights of access to the range lands.

Armed conflicts such as the Johnson County War have inspired Hollywood films, which have featured the conflicts between the farmer and the cattleman. Ever since *The Virginian* (1914), Hollywood has featured this conflict. One of the most popular of these films is *Shane* (1953). The dialog between two of the central characters in the film *Shane* (Paramount Pictures, 1953 – quoted from Morriss, 2004: 20–21) highlight the central role of property rights played in pastoral-sedentary agricultural conflict.<sup>9</sup>

Ryker (the Cattleman): We made this country. Found it and we made it.... Made a safe range out of this. Some of us died doin' it. We made it. And then people move in who've never had to rawhide it through the old days. They fence off my range and fence me off from water. Some of 'em like you plow ditches, take out irrigation water. And so the creek runs dry sometimes. I've got to move my stock because of it. The men that did the work and ran the risks have no rights?

Starrett (the Homesteader): You talk about rights. You think you got the right to say that nobody else has got any. Well, that ain't the way the government looks at it.

Ryker's statement in many ways reflects the key elements of John Locke's theory of property rights – that entitlement to property derives from one's labor.

Though the earth, and all inferior creatures, be common to all men, yet every man has a property in his own person: this no body has any right to but himself. The labour of his body, and the work of his hands, we may say, are properly his. Whatsoever then he removes out of the state that nature hath provided, and left it in, he hath mixed his labour with, and joined to it something that is his own, and thereby makes it his property. It being by him removed from the common state nature hath placed it in, it hath by this labour something annexed to it, that excludes the common right of other men: for this labour being the unquestionable property of the labourer, no man but he can have a right to what that is once joined to, at least where there is enough, and as good, left in common for others. (John Locke 1960 [1690], pp. 17–18)

Starrett's curt counter-argument is more Hobbesian in nature, whereby property rights are established by the sovereign authority of the state. Ultimately, it is Starrett's interpretation of rights that prevails in terms of the settlement pattern that shaped the American West. The state determines, defines, and designs property rights. Or to quote Hobbes:

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<sup>8</sup>Most of those arrested were freed shortly thereafter.

<sup>9</sup>The film is based on a novel of the same name written by Jack Schaefer (1949).

. . . there be no Propreity, no Dominion, no Mine and Thine distinct: but only that to be every mans that he can get: and for so long, as he can keep it. Thomas Hobbes, *Leviathan*, 1651, (quoted from Muthoo 2004: 288).

The role of the state in protecting property rights has been a major feature in theories of the development of the state. This is particularly evident in neo-institutionalist works (Douglass C. North 1981, Mancur Olson 2000, ?, Robert H. Bates 2001, Robert H. Bates 2008). In turn, the nature of property rights in a society shapes the pattern of state development.

The history of homesteading in the American West shaped the pattern of European settlement. US homesteading policy was conducted in piecemeal fashion such that large tracks of land were opened at different periods of history, with the great land rush in Oklahoma serving as a good example. US homesteading policy was driven by several factors. Libecap (1981) emphasizes the role of the General Land Office in obstructing the cattlemen's lobbying efforts. The informal norms and institutions governing communal range property rights were never recognized by the US Federal government. Additional political incentives ensured that property rights in the American West would change despite the economic inefficiencies of homesteading policy.<sup>10</sup> Allen (1991) contends that homesteading served as a means of enforcing property rights against aboriginal Native American Indian claims and offered a substitute for direct military force. McFerrin and Wills (2007) argue that homesteading policy reflected a desire to populate territories with as many people as possible. Settlement by lots of small-scale farms involves many more people than an open range controlled by a few cattlemen. If the population grew sufficiently large, the admission of a territory as a new state presented a strong incentive for political entrepreneurs. As more farmers moved into a territory, the Congressional delegation could likewise expand.

Linking this case with our model, each group expected to generate a livelihood from the land. When homesteading first began, co-existence was possible as the fences were not so numerous as to restrict the movement of the cattlemen. At this stage of development, government bias in favor of the homesteaders protected their property claims while only eventually making it harder for the cattlemen to survive. In the short-run, this led to conflict between the cattlemen and the homesteaders until the cattlemen ceased to exist as a group. The cattlemen became landed ranchers.

The political dynamics were also geared such that the bias in favor of the homesteaders was only going to grow, despite the cattlemen's efforts to lobby for the open range. Political elite in any territory in the US would be eyeing the prize of statehood, thereby enhancing their own power and prestige. To gain statehood required new migrants to the territory. The homesteading policy offered a nice mechanism for enticing people to migrate into a territory. Furthermore, once enough people moved into a territory they would vote. Eventually the farmer's share of the vote would exceed that of the cattlemen.

The case of the conflict between the cattlemen and homesteaders in Wyoming relates to several of our propositions. In contrast to many pastoral-sedentary agriculturalist conflicts, both parties were relatively well-off and could devote a fair amount of resources to fighting if necessary. There seems to be no contradiction of Proposition 1. Of course there was limited fungibility to transferring productive resources to fighting, but the point is that neither party truly had a resource constraint.

Moreover, both the cattlemen and the homesteaders engaged in fighting to some degree, implying an "interior solution". Neither party devoted their resources wholly to fighting. Moreover, we see some evidence supporting Proposition 4 – more property rights means less conflict. The eventual privatization of open range lands did eventually result in an end to pastoralism in America as well as an end to the violence, but the violence came at the expense of a way of life in America, for better or worse. In addition, increasing bias in property rights led to the violence. Corollary 5 and Proposition 6 thus appear to be supported in this case. The conflict was engendered by the homesteading policy and the introduction of a group whose use of the land directly challenged the open range.

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<sup>10</sup>Homesteading's "first come, first served" character creates an incentive to establish property rights too early (Terry Anderson & Peter J. Hill 1983).

## 4 Discussion

Much of the study of communal conflict is anchored in what is often referred to as “ethnic conflict”. The basis of analysis is the altercation between two groups linked to two different ethnic groups. Wars of secession or territorial autonomy (which involve the government and a non-state actor claiming to represent a distinctive ethnic group), urban riots (which pit two groups with different ethnic identities against one another), and farmer-herder conflicts (which take place between a pastoral group and sedentary agriculturalists, often constituting two different ethnic groups) are often grouped together as if the nature of conflict were defined by the nature of at least one of the actors. We focus on one type of conflict – communal violence between pastoralists (herders) and sedentary agriculturalists (farmers). Our model offers a starkly contrasting view. As such conflict is typically over access to land and water, we feature the underlying role of property rights. Two particular aspects of property rights are featured in this analysis: property rights protection (PRP) and bias in property rights enforcement (Bias). In modeling PRP as a variable, we are able to examine the interactions of non-state actors in an environment in which state institutions are neither perfect nor absent.

Our contest success function model demonstrates that increasing property rights protection reduces the effectiveness of fighting, which implies increasing the equilibrium allocation of productive effort. In other words, as PRP is increased, groups accordingly allocate more effort to butter rather than to guns. Our model also accounts the potential bias towards one interpretation of property rights over another interpretation. When two different groups are defined by their different uses and definitions of property, one group is inherently favored over another. This notion of bias stands in contrast to most economic models of enforcing property rights, which focus on property rights protection, but not the bias in this protection (Stergios Skaperdas 1992, Herschel Grossman & Minseong Kim 1995, Hirshleifer 1995, Joan Esteban & Debraj Ray 1999, Abhinay Muthoo 2004). These models stand in stark contrast to most economic models that assume property rights protection and thereby greatly extend our understanding of property rights, but nonetheless ignore the bias that is often associated with this enforcement. Such bias plays a regular role in farmer-herder conflicts as the two groups by definition regard property in fundamentally different ways. Bias and property rights protection interact to produce a non-monotonic result affecting the level of communal violence in a society. More particularly, if a society has a moderate level of PRP, but some degree of bias away from equity, an increase in PRP can result in either a decrease or an increase in the amount of fighting between the two groups. Thus, simply increasing PRP without addressing equity and bias issues can actually increase the risk of armed conflict between pastoralists and sedentary agriculturalists.

The implication of our analysis is that policy makers who encourage governments to focus on strengthening property rights institutions need also address the more sensitive issue of equity under the rule of law. The World Bank, without making the argument as we do, has altered its policy recommendations concerning rural land issues since the formulation of the World Bank’s “Land Reform Policy Paper” in 1975.<sup>11</sup> In an analysis of the evolution of World Bank policy towards property rights protection, Deininger and Binswanger (1999) outline three guiding principles in the 1975 paper: “the desirability of owner-operated family farms; the need for markets to permit land to be transferred to more productive users; and the importance of an egalitarian asset distribution” (247). They further argue that “in the 25 years since that paper was published, these guiding principles have remained the same, but it is now recognized that communal tenure systems can be more cost-effective than formal title, that titling programs should be judged on their *equity as well as their efficiency*” (247) (emphasis added). Indeed, World Bank policy has evolved considerably from its rather naive Coasian perspective<sup>12</sup> on private property advocated in 1975. Our model contributes a formal reasoning for why property rights protection alone cannot assure peaceful relations over issues of land and water access.

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<sup>11</sup>This view was echoed in the Bank’s 1997 *World Development Report The State in a Changing World?*.

<sup>12</sup>Coase won the 1991 Nobel Prize in Economics due to his work on the firm as well as his work on private property. His work on externalities and property rights (Ronald Coase 1960) was especially influential in certain policy circles.

## 5 Conclusion/Broader Implications

This paper is about the role of property rights in explaining conflict between herders and farmers. Yet the focus on the degree of protection and bias in property rights has much broader implications. If we expand our definition of TCV in our model from meaning “total communal violence” to “total societal inefficiencies and waste due to conflict over property rights”, the role of property rights can be seen in a wide variety of economic contexts. The governance of fisheries, for example, is affected by these two factors. While fishing disputes have led to armed violence,<sup>13</sup> the protection of fish stocks in important fishing grounds critically depends on state intervention to maintain these common resources.

The protection of intellectual property rights is another area where our model could be applicable, not in the sense of explaining armed violence, but in terms of explaining economic inefficiencies. Consider the costs of piracy where property rights are not enforced. At the other extreme, the tremendous legal costs and inefficiencies associated with the protection of a name or an idea—for example, the McDonald’s hamburger chain suing and winning a court case against a man whose name is McDonald—remind us how the bias and degree of protection of property rights are important to realms beyond farmer-herder conflict.

As for herder-farmer conflict, in the historical American West and indeed most of the world, the state has been biased against pastoralists. If for no other reason, sedentary agriculturalists are easier to tax. Sedentary agriculture also tends to support larger populations. Our analysis, however, demonstrates that this bias alone does not precipitate conflict between pastoralists and sedentary agriculturalists. Rather, higher levels of government involvement by way of increasing enforcement, increasing bias, or—in our case examples—both, led to communal violence.

Changing property rights protection can lead either to greater or lesser degrees of communal violence depending on the degree of government bias in a society. Thus, simply increasing property rights protection without addressing equity issues can increase the level of conflict in the society. Bias and property rights protection are intrinsically linked. Encouraging governments to focus on strengthening property rights institutions without addressing the more sensitive issue of equity is dangerous.

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<sup>13</sup>As is evident in the militarized interstate dispute (MIDs) dataset of the Correlates of War (COW) project, fishing disputes constitute a considerable portion of the non-fatal MIDs.

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