Creating Property Rights: Land Banks in Ghana

By ERNEST ARYEETEY AND CHRISTOPHER UDRY*

Insecure property rights over land have multiple ramifications for agriculture and the organization of rural economic activity (Besley and Ghatak 2009). The risk that land will be expropriated deters investment. Insecure property rights reduce the ability of borrowers to pledge land as collateral and thus tighten credit constraints. Ill-defined property right over land can inhibit land transactions – rentals or sales – and potential gains from trade are lost. Scarce resources, like labor, may be devoted to protecting one's insecure rights over plots (Field 2007).

In Ghana, land rights are typically gained by virtue of membership in a corporate group (e.g., extended family), but a robust market is emerging for land purchases and rentals, particularly in urban and peri-urban areas. Informal land markets in Ghana are beset with a number of problems including land conflicts, protracted litigation and adjudication failures, documentation bottlenecks and uncertainty. Land legislation in Ghana is perceived as incoherent, conflicting and often outdated. An unwieldy public land sector dominates the documentation of land rights, revenue collection and distribution. Land conflicts are becoming more frequent, judicial processes are overburdened, authority is overcentralized and corrupt. Conflict over multiple claims to particular plots occasionally becomes violent. Goldstein and Udry (2008) document the large investment disincentive effects of insecure tenure in agriculture in Ghana.

Almost 80% of the Ghana's land is held by customary landowners, mainly families, clans and traditional authorities (Kasanga and Kotey, 2001). These owners often do not record transactions; indeed, many are clothed in secrecy. As land transactions gradually move away from their familial/corporate base to short term rental for commercial purposes, multiple simultaneous transactions on the same plot have become more frequent and there is greatly increased insecurity (Onoma 2010). There is a high risk factor built into prices for land, with buyers prepared to pay a premium for land where security of tenure is less likely to be a problem.

A well-developed and efficient land titling and registration system would provide for the development of depersonalized land transactions and a separation of the rights of owners and users. Despite the failure of repeated attempts at constructing such land registration systems in Ghana, there are currently underway additional efforts that may in the end lead to such a system. In the meantime, we propose the decentralized, private creation of property rights via a new institutional innovation in Ghana – land banks. Land banks would be formal institutions to which land owners could lease lands under long-term arrangements. In turn, land banks would lease out land to commercial farmers and developers. The shareholders of the land banks would be the members of the group in whose names customary leaders currently manage land.

We proceed in two stages. First, we develop a very simple static model of land allocation under the current land tenure institutions in Ghana. This model provides a simple description of typical West African land tenure systems, and serves to clarify some of the consequences of the insecurity that they involve. Second, we embed this model in a dynamic game in which we introduce the land bank concept. The key dynamic element of the game is the evolution of beliefs about the security of tenure when a land bank exists: the land bank will have to operate at a loss until it builds up a sufficiently strong reputation for reliability in order to profit from the increased security it can offer.

I. Land Allocation with Tenure Insecurity

The central land tenure problem in West Africa is the insecurity with which land is held. This insecurity is summarized in our model by the assumption that landlords can rent out their land more than once

* Aryeetey: Institute of Statistical, Social and Economic Research, University of Ghana, and Brookings Institution, earyeetey@isser.ug.gh. Udry: Departmnet of Economics, Yale University, christopher.udry@yale.edu. Acknowledgements

simultaneously. We also assume that promises of future payments cannot be enforced, hence rental payments are made at the start of a rental agreement. The combination of these assumptions yields the tenure insecurity that is the focus of the model.

Most land in Ghana is held in customary tenure and its allocation is controlled by the leadership of stools, clans or families. We refer to these leaders as chiefs. We assume that every chief is 'small' and cannot influence the price of land. There is a continuum of chiefs of mass $T < 1$, each with one unit of land.

Chiefs do not farm; they rent out their land to others. Suppose the rental rate is r for a plot. If chief j rents out his land N_j times, he has the potential to earn $N_j r$ in rental revenue. We assume, however, that chiefs vary in their ability to exploit the opportunity to rent out a given plot multiple times. Perhaps this is related to his political power, or to his level of honesty. We summarize this variation by assuming that each chief j is associated with a parameter q_j drawn from a distribution Λ which is common knowledge to chiefs and farmers. q_j describes the probability that a chief will succeed in renting the plot multiple times without detection or penalty. Each time chief j rents a plot more than once, there is a probability $(1 - q_j)$ that he will exposed as making fraudulent deals and lose all the revenue from rental this period. Forfeited revenues are distributed in a lump sum to the population of farmers. A chief's strategy is to choose $N_j \in \{0, 1, 2...\}$.

We suppose chiefs are risk neutral. Chiefs are price-takers, hence a chief's expected rental earnings are r if he rents the land once, rq_j if he rents the land twice, rq_j^2 if he rents it thrice, and so on. Chief j chooses N_j according to

$$N_j = \arg \max_{N \in \mathbb{N}} r N q_j^{(N-1)}. \tag{1}$$

In some sections, the notation has the potential to become cumbersome. So we'll simplify matters by having chiefs be one of two types, so $q_j \in \{q^L, q^H\}$ with $q^L < 1/2$ and $1/2 \leq q^H < 3/4$, with $prob(q_j = q^L) = \lambda$.Thus the fraction λ of chiefs rent out their plots once, and $1 - \lambda$ rent out their plots twice. This simplification makes little difference in most of what follows; but we will point out those instances in which it might matter substantively. The aggregate supply of land is $T(2 - \lambda)$.

There is a continuum of farmers of mass 1 indexed by i. None has land of her own. Each can cultivate 1 plot. Farmer i earns y_i if she cultivates a plot. The returns vary across individuals, ranging between 0 and $\bar{y}$. We let $F(y)$ describe the fraction of farmers who earn less than y. If the chief controlling a plot has rented it more than once, the farmers resolve the differences at a cost c, and the plot is allocated with equal probability to one of them. Given their knowledge of Λ, each farmer begins with a prior belief that the plot she rents has been rented only once with probability λ. Hence, expected profits to farmer i from renting a plot at rental rate r are

$$y_i \frac{1+\lambda}{2} - r - (1-\lambda)c. \tag{2}$$

Farmers are risk neutral. Their only choice is to rent a plot or not. Hence, i demands a plot if and only if $y_i \geq 2\left(r + (1-\lambda)c\right)/(1+\lambda)$. An equilibrium will be a rental rate r such that the number of plots supplied by chiefs equals the number of plots demanded by farmers. In a static equilibrium we have

$$1 - F\left(\frac{2\left(r^* + (1-\lambda)c\right)}{1+\lambda}\right) = T(2-\lambda). \tag{3}$$

Landlords as a group would typically be better off if they did not rent out land more than once. This is always true when chiefs are all of the same type. Suppose $\lambda = 0$ so that all chiefs rent out their plot twice. In this case, each chief earns at most $2r^*$ (some, of course, forfeit all their revenue). Let r^1 be the rental rate in the counterfactual equilibrium in which each chief rented out his plot only once. So r^1 is defined by $T = 1 - F(r^1)$. But r^* is such that $2T = 1 - F(2(r^* + c))$. So $r^1 > 2(r^* + c) > 2r^*$ and every chief would be better off if all chiefs rented out land only once. There is a standard free rider problem: each chief finds it individually rational to rent out land multiple times, but the consequences of this for the equilibrium rental rate are that they are all made worse off. This is the essence of the inefficiency upon which the land bank will capitalize.

II. Strengthening Property Rights over Time

Farmers' needs change periodically, depending on their demographic circumstances and non-farm opportunities. As a consequence, their demand for plots for farming varies. As a consequence, farmers shift plots over time and obtain land in different geograph-

ical areas from a variety of sources (Goldstein and Udry 2008). To highlight this process, we assume that each farmer cultivates each piece of land for only one period. Thus all matches dissolve after one period. Chiefs and farmers are small, so the probability of farmer i being matched again with chief j is zero. We construct this version of the model such that all the interesting dynamics are introduced via the land bank itself. So before their introduction, the dynamic model will look like a repeated sequence of the static equilibrium above.

Both chiefs and farmers remain risk neutral and have a discount rate of β. A chiefs objective in period t is to maximize the future flow of rental income. Similarly, farmers seek to maximize the flow of expected net agricultural income. In the initial period each chief j draws q_j from the distribution Λ; and each farmer i draws y_i from the distribution F. These distributions are common knowledge.

In each period thereafter, chiefs can choose N_{jt}. Farmers can choose to rent land or not, depending upon the market rent. Farmers are then randomly matched with plots. After the match, farmers pay their rent, and then they realize whether the land has been rented out once or twice. Conflict costs are paid, conflicts are resolved, and production and consumption occur. At the end of period t, all matches between farmers and chiefs are dissolved, and the next period begins.

Without land banks, the dynamic game looks just like the static model outlined above. Because both landlords and tenants are small, the probability that i and j are matched is 0. When farmer i is matched with chief j in period t, she has a prior belief that the land will be rented out once with probability λ. During period t, i learns N_{jt}, which reveals a range of possible q_j to farmer i. So farmer i updates her beliefs about the chief $j's$ type to $\lambda_{ijt+1} \in \{0, 1\}$. This is irrelevant, however because i will never be matched with j again. $i's$ prior about any new match remains unchanged. Nothing changes with respect to i's behavior.

In some period, a land bank is formed. We label this period 0. We could model a variety of different objectives for the bank. For example, it might decide to maximize its size at some future period, subject to a zero profit constraint, or perhaps maximize farmer welfare subject to the same constraint. We begin by assuming that it is simply maximizing profit.

The bank can do only two things: it can rent in land, and it can rent it out. It differs from farmers and chiefs in 3 respects:

1) It (exogenously for this note) rents out land only once: $N_{bt} = 1$ for all t.

2) It can become large. It may rent in and out a strictly positive fraction of all plots.

3) It holds land for the long-term. Once it has rented a plot from a chief, it can choose to maintain its rental over that plot for more than one period, if the chief agrees.

A few comments on item (3) may be in order. It is well-established in the literature on land tenure in West Africa that farmer control over plots, once established and with crops growing, is quite secure (Austin 2004). Similarly, in urban and semi-urban areas, lands that have been built upon are relatively secure. It when land is fallow or vacant that most multiple claims occur. Assumption (3) is made to distinguish an institution that can hold land for long periods from the demands of farmers, whose need for particular plots can vary over relatively short time frames.

Because the bank may become large, it is possible that it may be able to charge a different price than the market price, and because it can continue a match with a chief or a farmer over multiple periods, its rental prices may vary across its contracts. Land bank profits in period t, then, are equal to the revenue it generates from renting out plots (at potentially varying prices to different farmers) minus the costs it faces in rental payments it makes to chiefs (again, at potentially varying prices), minus the cost of litigation that it faces when it attempts to rent from a chief who has rented out his plot more than once. The bank's objective is to maximize the present discounted value of the flow of bank profits at the same interest rate faced by the farmers and chiefs.

The land bank's primary choice in any period is γ_t, the number of plots it obtains in period t. To achieve this, it attempts to rent $\frac{2}{1+\lambda}\gamma_t$ plots. As it starts, the land bank faces high costs of obtaining land as it competes with farmers for land from the chiefs and pays the litigation costs to obtain control over plots. After it has obtained plots, though, its long-term pattern of holding enables it to pay less for the land and to avoid future conflict over the plots it has gained. As the land bank begins renting out plot, the key mechanism that drives the model emerges. This is the gradual diffusion across the population of knowledge about the practices of the land bank. At her first encounter with the land bank, a farmer presumes that it

acts like chiefs and will pay only the same rent that she would pay a chief. However, over time, as the churning of matching occurs, more and more farmers know that the land bank only rents out plots a single time, and hence are willing to pay more. As a consequence, eventually the land bank can begin making profits.

The land bank is large and identifiable. Hence it may be able to charge different prices than chiefs or farmers. This requires us to define how these different prices are determined. We adopt the following structure.

Farmer matched with chief. Both are small, rental is r_t. Either has option to withdraw; opportunity is to rent to another farmer at r_t or rent from another chief at r_t.

Chief matched with land bank: We assume that the land bank makes take it or leave it offers. Land bank offers r_t^{bj}; if the chief refuses he is matched with another farmer.

*Farmer matched with land bank:*We assume that the land bank makes take it or leave it offers. Land bank offers r_t^{bi}; if the farmer refuses she is matched with a chief.

Renegotiation: If the land bank rents a plot and wants to keep it, it makes a take it or leave it offer to the chief. If the chief agrees, the rental continues. Because the land bank has actual control, the chief cannot rent out the plot twice.

Consider the first period of the land bank's existence, which we label period 0. The land bank is renting plots in, but does not yet have the capacity to rent out. The land bank cannot distinguish between chiefs at this point, so $r_0^{bj} = r_0^b$. Land bank net revenues in this period are

$$\pi_0^b = -\frac{2}{1+\lambda}\gamma_0(r_0^b + (1-\lambda)c). \tag{4}$$

We show below that future payments to the chief make him just indifferent between renting to farmers and renting to the land bank. Hence $r_0^b = r_0$.In turn, r_0 is determined by $1 - F\left(2\left(r_0 + (1-\lambda)c\right)/(1+\lambda)\right) = T(2-\lambda) - 2\gamma_0/(1+\lambda)$. The land bank now knows the type of $2\gamma_0/(1+\lambda)$ chiefs, some of whom $(\gamma_0(1-\lambda)/(1+\lambda))$ end up not renting to the land bank.

The land bank controls γ_0 plots, and it knows the q_j of the chiefs who own those plots. Hence the land bank's take it or leave it offer to these chiefs is $N_j r_1 q_j^{(N_j-1)}$, which is the chief's expected rent if he rents plot out again. Hence, chiefs who rented out land once are offered r_1, and chiefs who rented out land twice are offered $2q^H r_1$. The gain to either type of chief of continuing his contract with the bank is 0, so the chiefs agree to continue. The land bank, then, is renting $2\lambda\gamma_0/(1+\lambda)$ plots from chiefs who rent out land only once, and $\gamma_0(1-\lambda)/(1+\lambda)$ plots from chiefs who rent out land twice.

These γ_0 plots are now rented out to farmers. No farmer has yet met the land bank. Hence all farmers i still have the prior $\lambda_{ib1} = \lambda$. Hence the price that can be charged of these farmers is the same as the market price, r_1.

So revenue in period 1 is $\gamma_0 r_1$. The cost of retained plots is $\gamma_0 2r_1\left(\lambda/(1+\lambda) + q^H(1-\lambda)/(1+\lambda)\right)$. And in addition, the land bank obtains an additional γ_1 plots by renting $2\gamma_1/(1+\lambda)$ plots, and pays $2\gamma_1(r_1 + (1-\lambda)c)/(1+\lambda)$ for those plots.

After period 1, the land bank begins encountering farmers to whom it has rented in the past. Since N_{jt} reveals q_j, the farmer knows that the bank will rent out its plot only once, and the bank knows this. Hence, the land bank can now make a higher take-it or leave it offer to the farmer. The farmer will accept an offer of $r_t^b = 2(r_t + (1-\lambda)c)/(1+\lambda) > r_t$. In period t, the probability that a farmer has rented from the land bank in the past is

$$K_t = 1 - \prod_{\tau=1}^{t}(1 - \sum_{n=0}^{\tau-1}\gamma_n) \tag{5}$$

which obviously approaches unity as t get large as long as any $\gamma_t > 0$.

Profits of the land bank in period t are

$$\begin{aligned}\pi_t^b \quad = \quad & \left(\sum_{\tau=0}^{t-1}\gamma_t\right)\times \\ & \left(r_t(1-K_t) + \left(\frac{2}{1+\lambda}(r_t + (1-\lambda)c\right)K_t\right) \\ & -\left(\sum_{\tau=0}^{t-1}\gamma_t\right)2r_t\left(\frac{\lambda}{1+\lambda} + q^H\frac{1-\lambda}{1+\lambda}\right) \\ & -\frac{2}{1+\lambda}\gamma_t(r_t + (1-\lambda)c)\end{aligned} \tag{6}$$

The banks' problem them, is to choose the sequence $\{\gamma_t\}$ to maximize the present discounted value

of the flow of profits. Since $q^H < 1$,

$$\left(\frac{2}{1+\lambda}(r_t + (1-\lambda)c\right) > 2r_t\left(\frac{\lambda}{1+\lambda} + q^H\frac{1-\lambda}{1+\lambda}\right). \tag{7}$$

Result: Hence as $K_t \to 1$, $\gamma_t = 0$ ensures $\pi_t^b > 0$. The land bank eventually makes positive profits, as knowledge of its practices spreads and it can charge its high price to a larger and larger fraction of the population.

III. Extensions

The land bank leverages three characteristics to provide secure land tenure, eventually at a profit. It (exogenously in this note) rents out plots only once. It can hold plots for the long term, avoiding the churning that provides an opportunity for individual chiefs to rent out the same plot of land multiple times. It can be large, thus building a reputation for renting out plots only once and charging an appropriately higher price in exchange for that added security. In effect, the land bank can internalize the free rider problem that afflicts the chiefs.

The process of learning about the characteristics of the land bank could be faster. We could model diffusion of this information via social networks or through the media. In that case, K would approach unity more rapidly. With social learning, low q chiefs would have an incentive to pretend to have higher q once they know that the bank pays more to a chief with a high q. Thus the equilibrium would involve an IC constraint for truthful revelation of q.

The most important actual use of a land bank in Ghana would be to facilitate the consolidation of plots for relatively large scale commercial projects. An investor with a large scale project would need to attempt to rent additional plots to increase her likelihood of actually obtaining enough plots to implement the project. This provides an additional margin for a land bank to improve the efficiency of allocation.

The introduction of land banks raises the equilibrium rent that can be charged on all plots. As a consequence, there may be an opportunity for land taxes to be introduced; all such previous efforts have been defeated by lobbying by the chiefs who control land. If some the price rise can be taxed away, the revenue could be used to reduce the costs of land conflict by subsidizing conflict resolution.

The introduction of land banks has the potential to transform land tenure in Ghana. There are risks, however, related to their internal management. One involves the dynamic incentives of the banks. As in any situation in which investments are made in building a reputation, there will be incentives to cash in on that reputation at some point. This is an interesting theoretical issue, but we believe that there is a more important management challenge. We have assumed that land banks have an effective means of committing to not renting out land multiple times. Their large size and long-term perspective provide incentives for each bank as a unit to build this reputation for honest dealing in the land market. However, how this incentive is transmitted through the levels of the bank to its employees doing the actual contracting is a fundamentally important management problem.

REFERENCES

Austin, Gareth. 2004. *Labour, Land, and Capital in Ghana : From Slavery to Free Labour in Asante, 1807-1956.* Rochester, NY: University of Rochester Press.

Besley, Timothy, and Maitreesh Ghatak. 2009. Property Rights and Economic Development. CEPR discussion paper 7234.

Fafchamps, M. 1992. Solidarity Networks in Rural Africa: Rational Peasants with a Moral Economy. *Economic Development and Cultural Change* 41: 147-74.

Field, Erica. 2007. Entitled to Work: Urban Property Rights and the Labor Supply in Peru. *Quarterly Journal of Economics* 122: 1561-1602.

Goldstein, Markus, and Christopher Udry. 2008. The Profits of Power: Land rights and Agricultural Investment in Ghana. *Journal of Political Economy* 116: 981-1022.

Kasanga, Kasim, and Nii Ashie Kosey. 2001. *Land Management in Ghana: Building on Tradition and Modernity*. Accra: University of Ghana.

Onoma, Ato Kwamena. 2010. *The Politics of Property Rights Institutions in Africa.* New York: Cambridge Univ.