Philippine Review of Economics and Business
Volume XXVII, No. 2 December 1990

DE FACTO TENURE AND THE ALLOCATION OF LAND AMONG SQUATTERS

By Orville Solon*

The hypothesis here is that the risk of eviction which squatters in a given area face largely determines the nature of property conventions that abate the state of initial conflict arising from contending claims over illegally occupied land. This is examined by analyzing the two most commonly observed land allocation mechanisms in squatter settlements.

1. Introduction

The main purpose of this paper is to examine, in an analytically consistent fashion, the allocation of land among squatters. Both theoretical and practical concerns motivate this study of the institutions governing the division of illegally occupied land and the enforcement of de facto land tenure. The two most commonly observed land allocation mechanisms in squatter settlements shall be the focus of the analysis here: land development led by a squatter landlord; and land development led by the squatters themselves via a community organization.

This paper explores what determines the conventions of de facto land tenure to which squatters conform and expect all other squatters to respect. The hypothesis here is that the risk of eviction which squatters in a given area face largely determines the nature of institutions that abate the state of initial conflict arising from contending claims over illegally occupied land. In the case of squatter-lord-led settlement, squatter tenants surrender their claims to the squatter landlord only to the extent that the latter provides protection from prior claims of the legal system. Similarly, squatters invest as much authority to a community organization as is needed in resisting eviction. Once such institutions are in place, markets begin to appear and function as if it were the primary institution for land allocation.

The practical concern of this paper is to help explain some of the issues raised by more recent researchers regarding unexpected and undesirable effects of de facto land tenure regularization. Amis (1984) reports that commercialization of illegal settlements, especially those protected by an elaborate system of political patronage, in Nairobi,

---

*Assistant Professor of Economics, University of the Philippines. The author would like to thank colleagues and friends for comments and criticisms on this paper which is substantially derived from the author's Ph. D. dissertation.

Kenya, effectively transformed what was once a subsistence housing sector into a large-scale unauthorized rental sector. Similar trends were observed in Latin America by Gilbert (1981) and Edwards (1981); the squatter is now a tenant. In the Philippines, Lindauer (1981) raised the question "whom have we served?" after doing cost-benefit calculations of a large government sites-and-services project in Tondo, Manila.

The main question these findings seem to raise concerns the distribution of the expected benefits of regularized de facto land tenure. The displacement of the poor from squatter settlements through the workings of informal housing and land markets is certainly not what public programs intended or expected to bring about.

The contribution of this paper on this issue is the careful examination of the workings of various existing institutions that govern the allocation of illegally occupied land among squatters. It can be argued that had these institutions been properly understood, appropriate mechanisms that would ensure the poor receive the full benefits of improvements in tenure security could have been devised. Furthermore, this paper will try to clarify other points raised, especially those concerning the role of informal land and housing markets.

In doing all these, the paper will first consider in Section 2 the effects of changes in tenure security on the individual squatter's welfare under two tenurial arrangements: the squatter as owner-occupier and the squatter as tenant. In Section, 3 the basic problem of land allocation among squatters is defined in terms of a Hobbesian state of nature where individuals of roughly equal strengths and capabilities initially contend without any settled rules of property; everyone seeks to take everything he can lay his hands on. The two commonly observed land allocation mechanisms are then discussed in more detail and are compared on the basis of their respective implications on the individual squatter's welfare. Results are summarized and concluding remarks are made in the last section.

2. The Household in the Squatter Sector

This section will consider more carefully the effects of changes in land tenure security on the welfare of the individual squatter under various tenurial arrangements local to the squatter sector. The analysis builds upon the framework introduced by Jimenez (1984) and Remolona (1984) which models squatting as a residential alternative involving uncertainties depending upon expectations of the probability of eviction. The basic model is, however, not sufficient to handle the questions raised here; parameters are introduced to accommodate various tenurial arrangements. Furthermore, to be more accurate in tracing the effects of changes in tenure security, housing services are specified as being derived from two sources: land and housing structure.

2.1 The Basic Model of Urban Squatting

Consider a stylized city where the residential area is composed of a nonsquatter (or legal) and a squatter (illegal) sector. A prospective resident, given a set of initial endowments, simply compares the welfare levels implied by each sector and settles wherever gives the resident a better deal. If the squatter sector implied, by definition, rent-free accommodations, the prospective resident's decision problem is simply determined by the trade-off between having to pay rent in the legal sector and facing the risk (and implied penalties) of eviction. Such a trade-off was examined by Remolona (1984) to determine the optimal squatter population. On the other hand, Jimenez (1984) examines a different tenurial setting where squatters are able to compare rental rates between the two sectors, the difference being the risk premium. In general, residential choice is determined by such factors as household incomes, the relevant housing prices, land area available to each sector, and the probability of eviction.

In the two-period model presented here, the residential circumstances of a squatter are determined by two states of nature conditioned by the probability of eviction, π. The household illegally occupies land in the first period and knows whether it is evicted or not only at the beginning of the second period. If not evicted, the household continues living in the squatter settlement; otherwise it is forced to seek alternative accommodations elsewhere. While it has been observed that, once evicted, squatters seek out other illegal settlements, it is assumed here, for convenience, that an evicted squatter will have to enter the legal sector in the second period.

It must be emphasized that, whatever the state of nature, the household is assumed to make optimal decisions. Hence, household decision-making under the state "not evicted" may be represented by the following allocation problem:

$$\text{(2.1)} \qquad \max: \; U^N = U^N(z^S{}_1,\, z^S{}_2,\, h^s\,(k^s, l^s))$$

$$\text{s.t. } I = z^s{}_1 + \delta z^s{}_2 + q^s k^s + (1-\phi)\, r^s l^s,$$

where U^N is a standard utility function assumed to be appropriately differentiable with respect to its arguments. z^s_1 and z^s_2 are the first and second period consumption composites, and $h^s(k^s, l^s)$ is a housing services function. $h(\,.\,)$ is increasing in l and k, i.e., $dh / dl > 0$ and $dh / dk > 0$. It is also assumed that housing services diminish with further increases in l and k, i.e. $d^2 h / dl^2 < 0$ and $d^2 h / dk^2 < 0$. Assume further that $h(0,k) = 0$ and $h(l,0) = 0$, i. e. no housing services may be derived without land nor without any housing structure. If $h(l, k)$ is homogeneous of degree one, then, using Euler's theorem of distribution, $ph = qk + rl$, where $q = p, (dh / dk)$ is the price of the housing structure, and $r = p\,(dh / dl)$ is the price of land.

The parameter $\emptyset$ is used to indicate the tenure status of the squatter. If $\emptyset = 1$, the household is an owner-occupier, paying land rent to itself. On the other hand, if $\emptyset = 0$, the household is a tenant renting squatter land. In effect, $\emptyset$ measures the squatter's degree of ownership or control over squatter land. The parameter d is a time discount factor.

Household decision-making if evicted is likewise represented by the following allocation problem:

(2.2) max: $U^E = U^E(z^s_P, z_2, h^E(l^E, k^E))$

$$\text{s.t. } I = z^s_1 + (I - \tau)\, q^s k^s + (1 - \emptyset)\, r^s l^s$$

$$+ \delta(z_2 + q_2 k_2 + r_2 l_2 + c)$$

where the evicted squatter's housing structure, k^E, is equal to whatever is salvaged from eviction, τk^s, plus whatever is added on for the new location, k_2, or $k^E = \tau k^s + k_2$, and $l^E = l_2$. Therefore, $h^E = h^E(\tau k^s + k_2, l_2)$. The parameter τ may be defined as the proportion of squatter housing salvaged from demolition. Of the components of housing, only structures may be transferred to the squatter's alternative location; developed land will have to be availed of through the legal market in the second period.

The prospective household, therefore, evaluates the expected utility urban squatting and compares this with that which may be realized in the legal sector. Formally,

(2.3) max: $EU^s = \pi U^{E*} + (1-\pi) U^{N*}$

where $U^{E*} = U^E (I - (1 - \tau)q^s k^s - (1\text{-}\phi)\, r^s l^s$

$\quad - \delta (z_2 + q_2 k_2 + r_2 l_2), z_2, h^E)$

$U^{N*} = U^N (I - \delta z^s_{\ 2} - q^s k^s - (1 - \phi)\, r^s l^s, z^s_{\ 2}, h^s).$

The optimality conditions for the squatter's allocation problem are:

(2.4) $\pi\ [-\delta\ (dU^E / dz^s_{\ 1}) + (dU^E / dz_2)\ ] = 0$

(2.5) $\pi\ [(\ - \delta q_2\ (dU^E / dz^s_{\ 1}) + (dU^E / dh^E)\ (dh^E / k^E\ ))] = 0$

(2.6) $\pi\ [-\delta r_2\ (dU^E / dz^s_{\ 1}) + (dU^E / dh^E)\ (dh^E / dl_2)\ ] = 0$

(2.7) $(1\text{-}\pi)\ [-\delta\ (dU^N / dz^s_{\ 1}) + (dU^N / dz^S_{\ 2})\ ] = 0$

(2.8) $-\ q^S\ [\ (1\text{-}\tau)\ \pi\ (dU^E / dz^s_{\ 1}) + (1\text{-}\pi)\ (dU^N / dz^S_{\ 1})\ ]$

$+\pi\tau\ (\ dU^E / dh^E\ )\ (\ dh^E / dk^E\ ) + (1\text{-}\pi)\ (dU^N / dh^S\ )\ (dh^S / dk^S) = 0$

(2.9) $-\ (1 - \phi)\ r^s\ [\ \pi\ (dU^E / dz^s_{\ 1}) + (1\text{-}\pi)\ (dU^N / dz^s_{\ 1})\ ]$

$+\ (1\text{-}\pi\ )\ \ (dU^N / dh^s\ )\ (\ dh^s / l^s\ )\ ] = 0.$

The conditions governing the optimal levels for first- and second-period consumption, (2.4) and (2.7), can be rearranged to show that in equilibrium the ratio of marginal utilities of first- and second-period consumption equals the ratio of their respective prices. These conditions are, of course, contingent on the states "evicted" and "not evicted."

In determining optimal housing structure if evicted, condition (2.5) requires that, on the margin, what the household gives up in terms of first-period consumption to pay for the purchase of second-period housing structures when evicted must equal its benefits in utility terms. However, if $\tau = 1$, i.e., all k^s is salvaged from the process of eviction, the sacrifice may be minimal. Similarly for land, condition (2.6) likewise requires that on the margin the value, in utility terms, of second-period land to be acquired in the legal sector must equal its benefits. Like the previous one, this condition only applies if the household is evicted.

The optimal level of squatter housing is primarily determined by conditions (2.8) and (2.9). Condition (2.8) requires that on the margin the value of squatter housing structure equals what is given up in terms of first-period consumption. Notice that the price of squatter housing structure is absorbed by first-period consumption weighted by the probability of eviction. This is so because benefits from squatter housing structure may still be derived even if eviction occurs but only to the extent that it remains unaffected by demolition. Condition (2.9) may be similarly interpreted. In equilibrium, the loss in first-period consumption weighted by the probability of eviction equals the gains from squatter land, all valued in utility terms. However, while consumption losses are applied to either state of nature, the gains from squatter housing are realized only if the household remains not evicted. The magnitude of the loss also depends on the tenurial status of the squatter household; for $\phi = 1$ the loss is zero.

The implications of conditions (2.8) and (2.9) are consistent with stylized facts on the housing condition of squatters. To show, suppose the price of housing structures are the same for both sectors, $q = q^s$. Then, by rearranging (2.8),

$$(dU^1 / dh_1)(dh_1 / dk_1) / (dU_1 / dz_1) > (dU^N / dh^N)(dh^N / dk^N) / (dU^s / dz^s_1),$$

i.e., the marginal rate of substitution between nonsquatter housing structures and first-period consumption is greater than the marginal rate of substitution between squatter housing structures and first-period consumption. Given the assumed shapes of the utility and housing services functions this implies that $k_1 > k^s$. Similarly, by rearranging (2.9) and comparing this with the nonsquatter's optimality condition for land, assuming $r_1 = r^s$, it can be shown that $l_1 > l^s$.

Relative to legal sector residents, squatters tend to have poorer housing structures and smaller lot sizes owing to the lack of tenure security. Deobele (1983) cites studies showing that variations in the differences of housing values between the two sectors are explained by perceived differences in tenure security. Estimates have also shown that demand for housing is highly sensitive to such risks (Malpezzi, et al., 1985).

2.2 Squatting and Tenure Security

The optimality conditions above derive the optimal levels $z^s_1{}^*$, $z^s_2{}^*$, $k_2{}^*$, $l_2{}^*$, $k_2{}^*$, l^{s*}, and k^{s*} which are determined to be functions of I, δ,

$(1\text{-}\emptyset)\, r^s$, $(1\text{-}\tau)\, q^s$, δq_2, and r_2. Substituting these into the expected utility function gives the squatter's indirect expected utility function,

$$(2.10) \quad V^s = \pi V^E + (1 - \pi)\, V^N$$

$$= V^s\,(I,\, \delta,\, (1 - \emptyset)r^s,\, (1 - \tau)q^s,\, \delta q_2,\, \delta r_2,\, \pi,\, c).$$

Changes in the desirability of squatting may be examined by comparing V^s with the indirect utility function attainable in the legal sector, V^L. V^s is specified to be increasing in income, and decreasing in the discount rate, the price of squatter land, the price of squatter housing structure, the price of second-period land, the price of second-period housing structure, the eviction rate, and the penalty associated with eviction.

What is more interesting, however, is how the equilibrium condition between the legal and the squatter residential sectors is maintained given changes in the parameters of the model. Of particular interest is how changes in tenure security (π) affect the condition that $V^L = V^s = V^{1*}$.

The way residential equilibrium is affected by changes in tenure security depends on the household's degree of ownership or control over squatter housing. The value of the parameter for the squatter's tenurial status (renter or owner-occupier), $\emptyset$, determines how V^s reacts to changes, say in π, to maintain equilibrium.

If $\emptyset = 1$, squatters are owner-occupiers, implying that claims on squatter land are protected by actual or physical occupation. The immediate implication is that squatter land is, in a way, free and the amount of land a household can claim for itself only depends on its ability to protect its claim physically from other squatters. Assuming all squatter households are equally capable of protecting their claims, then the ultimate limiting factor would be the amount of land available for squatting. Hence, the squatters' expected utility function specified in (2.3) will be maximized subject to a land area constraint, $A^s = l^s N^s$ where A^s is total available squatter land, and N^s is the number of squatters. Hence, the loss of desirability of squatting caused by an increase in the probability of eviction will be compensated for by lower housing density or larger squatter lot sizes. As the probability of evicition increases, less households will squat, leaving more space for those who nonetheless do. Totally differentiating $V^1 - V^s = 0$ and rearranging the terms gives $d\,(A^s / N^S) / d\pi = -\,(dV^s / d\pi) / (dV^s / dA^s) > 0$. The trade-off between tenure security and housing density determines that residential equilibrium is attained. This is the type of squatting modelled by Remolona (1984).

The case $\phi = 0$ describes a situation where squatters are tenants renting squatter land from a squatter lord. This implies that de facto property rights over squatter land have been fully established; claims are now protected by means other than actual physical occupation. Hence, an increase in the perceived probability of eviction implying a loss in the desirability of squatting will be compensated for by a decrease in the rental price of squatter housing, particularly land rent. Since less households become interested in squatting, squatter lords will begin to bid down prices. Totally differentiating $V^l - V^s = 0$ gives $dr^s / d\pi = - (dV^s / d\pi / (dV^s / dr^s) > 0$. This trade-off between squatter rent and tenure security allows for residential equilibrium to prevail despite changes in π. This is the case investigated by Jimenez's (1984) model.

Besides housing differences between the legal and squatter sectors, another interesting issue in the literature concerns the income profile of squatters. Earlier research popularized the stylized fact that squatters are poorer than nonsquatters (Laquian, 1972; MCGee, 1979; Kearns, 1979). This led to the hypothesis that squatting is an adaptive strategy exclusive to the urban poor. However, more recent research have shown that it is not only the poor who squat and that the poor are also to be found in the legal residential sector (Lindauer, 1981; Follain, 1982; Amis, 1984).

The previous discussions were silent on income differences since it was assumed that all households, squatters and nonsquatters alike, have identical incomes. It might be interesting to lift such an assumption to see whether the analytical framework used here can shed some light on the issue concerning squatting and household incomes. The hypothesis advanced here is that the relationship between squatting and income that prevails depends on the level of de facto property rights development in the squatter area.

First, consider the case where claims over squatter land are protected by actual occupation by the household. Hence, incomes will have little or nothing to do with the household's ability to protect its claims. It was specified that $dV^s / dI > 0$. However, if h^s can be considered inferior to h_1 owing to lack of tenure security then $dh^s / dI < dh_1 / dI$. This in turn implies that $dV^s / dI < dV^1 / dI$, i.e., the richer the household, the less attractive squatting becomes because the lack of tenure security severely limits housing consumption. If it can also be assumed that V^s $(I = 0) > V^1 (I = 0)$, (since at least land is free), then there exists I^* which solves $V^s (I) = V^1 (I)$ that determines a threshold. Households with incomes below Remolona's threshold squat while those with incomes above it do otherwise.

Where de facto property rights are well established, rental squatter housing may arise, changing the relationship between squatting and income. Safer settlements tend to be occupied by richer families. If $(dr^s / d\pi)$ / rich > $(dr^s / d\pi)$ I poor then, as Jimenez has shown, richer households will outbid poorer households for safer settlements.

3. Land Allocation Among Squatters

3.1. *Hobbes' State of Nature and Conventions of Property in the Squatter Sector*

In the Hobbesian state, the central problem is that there are no settled rules of property; everyone seeks to take everything he can lay his hands on. Assuming contenders are sufficiently equal in strength and cunning, the fight will most likely be harmful to both. Therefore, conventions of property will most certainly arise (Sugden, 1984; Schotter, 1981).

In the case of urban squatting, the struggle for land is played at two levels: between legal landowners and the squatters via the wider legal and political system; and among the squatters themselves. The conflict at the first level has been described and analyzed in previous research (Deobele, 1983; Hoy and Jimenez, 1984). What has to be carefully examined is how the conflict at the second level is settled, and how the nature of the struggle at the first level affects the latter.

As squatters violate prior claims and illegally occupy the land in question, they enter into a state not unlike that described by Hobbes as the starting point in the analysis of the development of property rights. Assuming squatters are equally capable of protecting their claims from other contenders, the development of de facto property may be examined here. The difference between Hobbes' state and that which prevails in the squatter sector has something to do with the extent the squatters are vulnerable to the assertions by legal owners on the illegally occupied land.

Assuming all squatters face the same risk of eviction, the property convention that arises would be similar to that described by Sugden as that which arises from a division game: possession or, in the specific case of urban squatting, occupation. Each squatter occupies a portion, a_i, of the land in question, and $\Sigma a_i = 1$ for $i = 1, \ldots, n$ where n is the number of illegal contenders. This is the property convention implicit in Remolona's model where each squatter occupies A / n where A is the total land area. This convention, however, does not imply that squatters remain owner-occupiers and that rental markets for squatter accommodations do not arise. A squatter can always sublet part of what she occupies to others. What is important is that everyone conforms to the established convention, everyone expects everyone else to conform to it, and everyone prefers to conform to it on condition that others do.

If some prospective illegal land occupant faces a lower risk of eviction due to, say, patronage within the wider legal system, the convention described earlier will not be stable. The legal owner can simply evict by attrition, saving those with stronger connections for last. There is, therefore, incentive for those who differentially face a higher eviction rate to surrender their claims to those better protected. Henceforth, the property convention shall be referred to as one of protection.

Unlike that of occupation, the convention of protection naturally gives rise to rental markets with those who are better connected as the squatter landlords and the rest as squatter tenants. At the very least, the latter will pay rent equal to the value of protection provided by the former.

The welfare implications of these two conventions of de facto land property shall be examined next. This is done by specifying two models of squatter settlement development: the squatter-lord-led and the community-led models.

3.2 Squatter–Lord–Led Land Allocation

In this model of squatter settlement development, land is effectively controlled by the squatter landlord. As mentioned earlier, "ownership" of land is in most cases obtained through a system of political patronage in the wider political system (Deobele, 1983; Amis, 1984). Given this, what remains is for the squatter lord to subdivide and let out residential lots.

The squatter lord's control over land is recognized to the extent that its "connections" are perceived as vital to tenure security. In which case, the probability of eviction may be considered as a decreasing function of the squatter lord's representations in the political system, b, i.e.

$$(3.1) \quad \pi = \pi\ (b)$$

where $d\pi / db < 0$ and $d^2\pi / db^2 < 0$. This means that the better connected landlord is, the lower is the perceived threat of eviction. However it is assumed that the decline in the eviction rate diminishes with connections.

Given an area A^s under her control, the squatter lord faces two problems. First is how to divide the area most profitably given the squatters' bids for various lot sizes. This aspect is similar to the developer's problem in the legal sector (see Edelson, 1975). The second problem deals with the determination of the optimal level of political representation to be made.

The cost of developing and protecting squatter land is assumed to be linear in the number of lots, X of size l^s, and the level of representations made, b,

$$(3.2) \quad C^s = \sigma X + \mu b$$

where σ is the cost of developing a lot, and μ is the necessary bribe or representation expense per unit level of connection.

The squatter lord's problem may now be written as

$$(3.3) \quad \max_{\{l^s,\, b\}}: RN^s = R^s X - (\sigma X + \mu b)$$

$$\text{s.t.} \quad l^s X = A^s\ , \ X \leq N^s, \text{ and } V^1 - V^s = 0,$$

where R^s is the household's bid for squatter accommodations, and N^s is the squatter population. Here, $\phi = 0$ for all households.

R^s may be expressed in terms of the squatter's equilibrium condition by defining an expected expenditure function,

$$(3.4) \quad I^s = \pi I^E + (1\text{-}\pi)\ I^N$$

where $I^E = z^s_1 + \delta z_2 + (1 - \tau)q^s k^s + r^s l^s + \delta(p_2 h_2 + c)$

$I^N = z^s_1 + \delta z^s_2 + q^s k^s + r^s l^s.$

The problem in (2.3) may then be expressed as a minimization problem using (3.4) as the objective function minimized subject to U^{E*} and U^{N*}, the utility levels under each contingency which solves $V^s = V^{1*}$. The household's optimal bid for squatter accommodations may then be written as

(3.5) $R^{s*} \equiv r^s l^s = I^s — \pi B^{E*} — (1\text{-}\pi)\, B^{N*}$

where $B^{E*} \equiv z^s_1{}^* \,(\, U^{E*} \,, z_2 \,, h^E \,) + (1\text{-}\tau)\, q^s k^s + \delta\, (z_2 + p_2\, h_2)$

$B^{N*} \equiv z^s_1{}^* \,(\, U^{N*} \,, z^s_2 \,, h^s \,) + \delta z^s_2 + q^s k^s.$

Given (3.5) and assuming $N^s > X$ (then it would pay to set $l^s X = A^s$), the problem in (3.3) may be rewritten as

max: $\quad R N^S = [I^S - \pi\,(b)\, B^{E*} - \;(1\text{-}\pi\,(b)\,)\, B^{N*} - \sigma]\, A^S /\, h^S - \mu b.$

$\{I^S, b\}$

The optimality conditions for the squatter lord's problem are

(3.6) $\quad (\, 1\text{-}\pi \,) \;(\, dz^s_1{}^* \,/\, dh^s \,) \;\;(\, dh^s \,/\, l^s \,)$

$+ \;\; (r^s - \sigma \,/\, h^S) \;\; = \;\; 0$

(3.7) $\quad (d\pi \,/\, db) \quad (B^{N*} - B^{E*}) \;\; - \;\; (\mu \,/X\,) \; = \; 0$

Condition (3.6) states that to maximize profits lot size l^s is chosen such that what the squatter is willing to give up in terms of the consumption commodity for a marginal increase in land equals the net rent per unit land. The marginal utility of squatter land (represented by the first term in (3.6)) discounted for the probability of noneviction should be equal to squatter rent net of protection cost per unit lot for equilibrium to prevail. On the other hand, condition (3.7) requires that the squatter lord only makes enough representations to maintain its hold over the squatter area to the extent that the reduction of the squatter's maximum expected expenditures once evicted (first term in (3.7)) is equal to the protection cost per lot. In effect, the reduction of expected cost of eviction to the squatter is what is used as bribe for better tenure security.

Conditions (3.6) and (3.7) are Pareto-efficiency conditions since the squatter lord's rental profits are maximized holding squatters' welfare levels fixed equal to V^{1*}. It pays the squatter lord to set l^s and b at Pareto-optimal levels; otherwise households will move to the legal sector or to more "competitive" and better protected squatter settlements.

Assuming an interior solution, the optimal lot size, l^{s*} , and level of protection, b^*, are determined to be functions of p^s, p_2, σ, μ among other parameters in the model. Equilibrium analysis determines that $dl^s / d\sigma > 0$, i.e., the total area is divided into fewer lots as development cost per lot increases. The squatter lord cannot speculate on squatter land since it was assumed squatting only happens in the first period. It is also determined that $dl^s / d\mu > 0$ since the larger the lot size the higher the household's premium for tenure security which in turn is used for μ. An exogenous increase in the probability of eviction will reduce the optimal lot size, $dl^s / d\pi < 0$. In maintaining equilibrium between the two residential sectors, the increase in π must be compensated for by a reduction in r^s to which the landlord responds by subdividing the squatter area into smaller lot sizes.

3.3 Community Organization-Led Land Allocation

In this model, de facto property rights over squatter land are held collectively by the squatters themselves. The functions of land development and protection are performed by the squatter community organization through effective population control.

The community organization determines the average lot size of the settlement in handling the trade-off between housing density and tenure security. It is assumed here that all households are equally capable of protecting their claims. Therefore, all households are owner-occupiers, i.e. $\phi = 1$.

Following studies cited by Jimenez (1985) and Gilbert and Gugler (1982), a consolidated community perceives improvement in tenure security from a sense of "strength in number." Legal landowners will find it easy to evict one or two families but would likely encounter difficulties in dealing with a large and cohesive group. As in the SL model, de facto tenure arises from representations to the political system. A well-organized community enhances tenure security by constituting themselves as a block of votes or by engaging in acts of civil disobedience. However, while an additional squatter increases the community's sense of security, it reduces available space.

The role of the squatter community organization as protector may be formally characterized by considering the perceived rate of eviction as some function of community size, N^s,

$$\pi = \pi(N^s) \tag{3.8}$$

where $d\pi / dn^s < 0$ and $d\pi^2 / dN^{s2} > 0$. This implies that the greater the squatter population, the safer the settlement. It is also assumed that the increase in security increases with population size.

What makes it impossible for a community to accommodate as much members such that $\pi = 0$ is limited space. While the number of squatters increases the settlement's security, it also raises housing density (smaller lot sizes), making squatting less attractive.

In effect the household joins a community where EU^s is maximixed subject to the area constraint. Formally,

$$\max: EU^s = \pi (A^s / l^s)U^{E*} + (1 - \pi A^s / l^s)) U^{N*} \tag{3.9}$$

where $U^{N*} = U^N (I - q^s k^s - \delta z_2, h^s)$

$$U^{E*} = U^E (I - (1\text{-}\tau) q^s k^s - \delta(z_2 + p_2 h_2 + c), h^E)$$

The relevant optimality condition for the problem in (3.9) is

$$(1\text{-}\pi) (dU^N / dh^N) (dh^s / dl^s) - (d\pi / l^s) (U^N - U^E) = 0. \tag{3.10}$$

This implies that the household joins a community large enough such that the security provided in utility terms equals the weighted marginal utility of squatter land its population size determines.

Since the community is able to internalize risk reduction and housing density, increases in eviction efforts meant to reduce the number of squatters may lead to opposite results. An exogenous increase in π throughout the city will make large or high density settlements more attractive assuming the condition in (3.10) is satisfied.

3.4 *The Land Allocation Solutions Compared*

The solutions to the squater-lord-led (SL) and the community-led (CL) models of land allocation are both Pareto-efficient since these are determined holding the squatters' welfare level fixed equal to V^{l*}. If both types of settlements were to coexist in an urban area, in equilibrium, $V^{SL} = V^{CL} = V^{L*}$, where the first two terms are the squatter's expected indirect utility in the SL and CL settlements, respectively. It might seem that the only potential efficiency advantage of the SL solution is that squatters need not organize and engage in group decision-making.

Looking at the way the function of protection is performed in each model leads to the conclusion that housing density in a CL settlement will at least be as congested as an SL settlement, holding everything else constant. Recall that protection provided by the squatter lord does not depend on population size but rather on the premium households are willing to give up for better tenure security. For the same level of protection, the SL community can exist with lower housing density as long as the total risk premium equals the cost of representation required for the level of protection. A CL community, on the other hand, requires some minimum population size (or threshold size) to provide the same level of protection.

Assuming zero organizing cost, the SL model becomes unstable as settlement size increases. The squatter lord's hold over the community becomes tenuous since there is no way of determining which factor accounts for tenure security: community size or the landlord's connections.

The SL and CL solutions also differ in terms of the distribution of rent and risk. Rents paid by squatter tenants in an SL community are allocated for development and protection. The former is retained by the squatter lord while the latter portion accrues to political patrons. On the other hand, in a CL community rent is shared equally by its members.

In terms of risk-sharing, assuming households are risk-neutral, the SL community is more attractive. The squatter lord effectively shares possible losses due to eviction given her investments in land development. In the CL community, members equally share such losses.

Another area where differences between the two solutions may be identified is the process of land occupation. It is expected that land invasions tend to be associated with the formation of SD settlements whereas accretive growth tends to be associated with SL settlements. Jimenez (1985) explains land invasions in terms of the threshold population size required for risk reduction through community organization to be effectively realized. Settlements with populations less than the threshold are deemed unstable as their existence cannot be sustained given exogenous increases in eviction efforts.

The formation of CL settlements may be accretive since risk reduction has nothing to do with population size. In a more dynamic setting, the squatter lord has the option of adjusting the timing of occupancy to exploit possible differences between present and future rental prices.

However, the CL settlements once established might be more difficult to evict. Efforts to evict partially will be met with resistance by entire communities. On the other hand, notwithstanding the squatter lord's connections, the SL community may be easily evicted by attrition. This result seems to suggest that the source of apparent stability of squatter settlements in Metro Manila is the fact that 80 percent of these communities are organized.

Thus far, the analysis has been silent on transactions costs involved in land allocation among squatters. Once introduced, new constraints and new solutions are determined which could possibly change the previous result that land will be allocated and protected to yield the highest value to the community regardless of property rights and institutional arrangements.

Transactions costs figure significantly in the enforcement of de facto property rights. Under the SL model, de facto tenure over land is privatized by the squatter lord. Squatters, in turn, recognize such right and contract to rent housing because of the squatter lord's influence over the entire settlement's tenure security. Similarly, individual squatter households subject themselves to the will of the community in recognition of its role in providing security from eviction.

At this level of the discussion there is no basis to suppose that the SL solution is more coercive. Obviously, coercion will be applied by the squatter lord to maintain her hold over the squatter area. Likewise, the squatter community might engage in coercive activity to maintain a cohesive community. The police function of the community organization arises since community activity (and its effect on tenure security) is a public good and is, therefore, subject to free riding by individual households.

Some urban antropologists have expressed concern over the diminishing influence of kinship and ethnic ties in squatter settlements once commercialization sets in. It must be mentioned that such institutions prevail or are weakened depending on their role in the enforcement of de facto property rights over squatter land. Kinship and ethnic biases might help maintain a cohesive community and minimize free riding among members. However, these may be discouraged or avoided under the SL model since a strong sense of community threatens or weakens the squatter lord's claim over the land.

4. Concluding Remarks

Despite lack of tenure security squatters establish institutions not unlike those outside their communities. In recognition of its role in risk reduction, squatters engage in group decision-making and surrender part of their resources and authority to a community organization. In some settlements tenancy among squatters exists and will remain stable as long as the squatter tenants perceive the squatter landlord as instrumental in risk reduction.

The analysis here suggests that observed "commercialization" of squatter settlements follow logically from moves by public authorities to regularize tenure. The irony is that the highly idealized community of closely knit and cohesive squatters has comparative advantage only over higher levels of eviction risk. As lack of tenure security diminishes, contracts for the rental or sale of occupancy rights are easily drawn and enforced. Hence, informal markets for squatter land and housing arise and flourish.

The question concerning the distribution of benefits from the regularization of de facto land tenure is a legitimate one. Allowing "professional" squatters to speculate over policy changes concerning eviction versus accommodation defeats the purpose of self-help solutions. However, to remove altogether the squatter's option to realize the value of a previously illegal claim might just be equally objectionable.

References

Amis (1984), "Squatters or Tenants: the Commercialization of Unauthorized Housing in Nairobi," *World Development*, 12:87-96.

Deobele (1983), "Concepts of Urban Land Tenure," in *Urban Land Policy: Issues and Opportunities*, ed. Dunkerley, Oxford University Press.

Edelson (1975), "The Developer's Problem, or How to Divide a Piece of Land Most Profitably," *Journal of Urban Economics*, 2:349-365.

Edwards, M. (1982), "Cities of Tenants: Renting Among the Urban Poor in Latin America," in *Urbanization in Contemporary Latin America*, A. Gilbert *et al.*, London: Wiley.

Evers (1977), "Urban Expansion and Land Ownership in Underdeveloped Societies," in *The City in Comparative Perspective*, ed. Walton and Masotti, Halsted Press.

Follain (1982), "The Demand for Residential Living Space in Korea," *Journal of Development Economics*, 11:249-272.

Gilbert and Gugler (1982), *Cities, Poverty, and Development: Urbanization in the Third World*, Oxford University Press.

Henderson (1980), "Community Development: The Effects of Growth and Uncertainty," *American Economic Review*, 70:894-910.

Hoy and Jimenez (1984), "Analytical Issues in Urban Land Tenure in Developing Countries," University of Western Ontario, (mimeo.).

Jimenez (1984), "Tenure Security and Urban Squatting," *The Review of Economics and Statistics,* 64: 556-567.

Jimenez (1985), "Urban Squatting and Community Organization in Developing Countries," *Journal of Public Economics*, 27:69-92.

Laquian (1972), *Slums and Squatters in Six Philippine Cities*, SEADAG.

Laquian (1981), "Review and Evaluation of Urban Accommodationist Policies in Population Distribution," in *Population Distribution Policies in Development Planning,* UN.

Lindauer (1981), "The Tondo Project: Whom Have We Served?" *Philippine Journal of Public Administration,* 25:249-272.

Malpezzi, *et al.* (1985), "Housing Demand in Developing Countries", World Bank Staff Working Paper no. 733.

Peattie and Aldrete-Haas (1981), "Marginal Settlements in Developing Countries," *Annual Review of Sociology*, 7:157-175.

Remolona (1984), "A Simple Model of Squatters," *Philippine Review of Economics and Business,* Vol. 21: 101-111.

Roberts (1978), *Cities of Peasants: The Political Economy of Urbanization* in the *Third World*, Edward Arnold/Sage.

Schotter (1981), *The Economic Theory of Social Institutions,* Cambridge University Press.

Solon (1987), *An Essay in the Theory of Urban Squatting and Land Development*, Unpublished Ph. D. Dissertation, UPSE.

Sugden (1985), *The Economics of Rights, Co-operation and Welfare,* Basil Blackwell.

Ross (1973), *The Political Integration of Urban Squatters*, Northwestern University Press.

Turner (1976), "*Housing by People,*" In *Land Allocation Solutions Compared,* ed. Marion Boyars.