The distributive impact of land markets in Central Uganda

by

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Abstract: This paper presents first-hand evidence about land distribution and the impact of land markets from a sample of 36 villages in East and Central Uganda, a region with a long tradition of both land market activity and rural-rural migration. Rather than leading to a concentration of land assets in the hands of a minority, land markets correct initial inequality in land endowments : a handicap of one acre in land inherited is on average compensated by an increase of about 0.75 acres of land acquired through the market. Half of this increase is achieved through the land sales market, and the other half through land rental and borrowals. Moreover, there is apparently no discrimination against migrant farmers in the way village-level land markets operate as migrants are able to convert their entire initial endowments in the native village into lands purchased in the host village. These two central results have been obtained using an original econometric model based on the distinction between desired and actual farm size, treating land rentals as a residual adjustment, and allowing for the endogeneity of migratory decisions.

1. Introduction

Land markets are considered to be an essential precondition of agricultural development in low-income countries. This view underlies structural adjustment and other programs set up by international donor agencies, especially the World Bank, to promote economic growth through institutional change. It is based upon the following efficiency considerations. First, markets allow land to be better allocated among potential users and to be consolidated into more efficient farm units. Second, they tend to promote investment because land acquires collateral value and access to credit is therefore easier, and because improvements made through investment can be better realized, thereby increasing its expected return. A growing body of empirical literature has been recently devoted to testing those relationships and assessing their relative importance (see, in particular, Feder (1987), Bruce and Migot-Adholla (1994), Besley (1995), and Brasselle, Gaspart and Platteau (2000), Platteau (2000)).

By contrast, the distributive effects of emerging land markets have received much less attention. *Prima facie*, the evidence of an inverse relationship between farm size and land productivity suggests that a free land (rental and sale) market ought to lead to a relatively egalitarian agrarian structure. However, when the optimal farm size is large, one expects land distribution to gradually evolve towards a polarized pattern. Such was the view expressed by Lord Swynnerton when defending his plan to introduce land titling in Kenya (1954): "In future, if these recommendations are accepted, the former government policy will be reversed and able and energetic rich Africans will be able to acquire more land, and bad and poor…less, creating a landed and landless class. This is a normal step in the development of a country" (Kiamba, (1989, 132)).

The same conclusion is attained by authors who stress instead the pervasive presence of rural market imperfections. They fear that, through distress sales or through the seizure of

mortgaged land, the activation of the land market is likely to cause increased land concentration at the expense of smallholders (such examples of distress sales were reported for Kenya by Green (1987) and Collier (1983); for a thorough analysis based on West African background data of the processes through which small and efficient producers sell land to large and less efficient producers, see Zimmerman and Carter (1997)). Being less able to cope with risks, the latter may indeed find their initial asset position unsustainable over time in the face of repeated and correlated adverse shocks. By contrast, better-endowed farmers are able to insure against such shocks through access to credit, temporary depletion of accumulated non-land assets, diversification of income sources (including access to non-agricultural incomes), etc… Because even relatively minor differences in initial endowments map into different risk-coping capacities, the land market, when it arises, tends to polarize the land ownership distribution (Carter (1997: 583)).

In this perspective, land distribution evolves not so much as a result of sales by inefficient smallholders, but because of various dysfunctionings that plague labour, credit and insurance markets in developing economies (see Berry and Cline (1979), Eswaran and Kotwal (1986), Sadoulet and de Janvry (1995, 258-62), Dercon (1998), Carter and Zimmerman (1998), Zimmerman and Carter (1999), and Mookherjee and Ray (2000)).[1] In their case study of Western Rwanda, André and Platteau (1998) show that land inequality has perceptibly increased in a short span of time and that, in a Gini decomposition approach, the percentage contribution of market purchases to overall inequality in land distribution increased dramatically, from 24% in 1988 to 47% in 1993. Underlying this evolution is the positive

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[1] Note that the market imperfections that bear upon land distribution are not limited to the rural environment. The wealthy elite may choose to accumulate land in an unproductive manner in so far as it provides them with a valuable collateral for non-agricultural loans and with an effective hedge against inflation in a context of imperfect nationwide capital markets (for evidence on Uganda, see Barrows and Roth (1989)). This is especially true of peri-urban areas where there is a large incidence of absentee ownership (Green (1987); Collier (1983)). Unproductive acquisition of land assets may also arise from concerns with old-age insurance and retirement, as well as from social prestige and political considerations (such as the need to acquire membership in a rural community to get elected in local councils and start a political career) that confer a non-productive value on land ownership (Baland and Robinson (2000); Doornbos (1975)).

relation between landownership position and access to regular income opportunities outside the agricultural sector. Indeed, even though poor households are most in need to complement their agricultural incomes, they are disadvantaged in their access to non-agricultural employment. As a result, wealthier households have been in a strong position to acquire land through the market: almost 85 % of the households earning regular non-agricultural incomes have actually purchased land. By contrast, 65 % of the other households had to sell land and at the same time were never able to buy any. Revealingly, almost two-thirds of a total of 247 land sales reported in the study can be considered as distress sales, and the proceeds of about half of these distress sales have been used to finance subsistence food and medical expenditures.[2]

Contrasting with the above evidence is the conclusion reached by J.F. Dubuisson (1998) in his study of rural land markets in Benin (in a village situated at 40 km from Cotonou): land market transactions there help mitigate rather than accentuate inequality in land distribution as a significant proportion of land parcels are actually purchased by villagers with a low initial land endowment while many sales come from those with the opposite characteristics. Similarly, a study by Place and Migot-Adholla (1998) in Kenya did not find that land markets were used to accumulate land –most purchases formed the only piece of land of the buyer. Relatedly, Pinckney and Kimuyu (1994) did not find evidence of households involuntarily losing rights to land in their Kenyan study site. As these authors themselves acknowledge, however, the issue is difficult to study because households which have sold all their rights to land are the most likely to have migrated from the village surveyed. Therefore, their sales are not taken into account in such surveys.

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[2] There is also a direct relationship between access to regular non-agricultural incomes and access to credit as local rotating saving-and-credit associations (known as 'tontines' in Rwanda) tend to exclude farmers with no regular incomes from which to pay their periodic contributions to the common pot. As membership in these associations gives access to consumption credit, such exclusion further deprives poor households of another important and flexible insurance device (Platteau, 1997).

At a higher level, it could also be argued that, in an economy with differently endowed areas, land market development should trigger off large interregional migratory movements. More precisely, one expects farmers from less endowed areas to purchase land and settle in better endowed areas, thereby contributing to mitigate interregional disparities in land ownership. This prediction, however, assumes away all market imperfections or cultural influences that have the effect of privileging community members (insiders) over strangers (outsiders) in land sale transactions. Thus, at least in the initial stage of land market development, the rights to rent out or to sell land parcels are seriously circumscribed by the requirement that land ought to remain within the family or lineage. It is the responsibility of the lineage heads to see to it that this condition is duly abided by and this is why their permission is explicitly required before any sale of land can take place. Later, land sales tend to be subjected to a right of pre-emption by family members, or to a right of repurchase by the seller (see in particular Bruce (1986, 1993)). In Kenya, for example, in theory at least, Land Control Boards require approval from all family members prior to sale of land to outsiders. The possibility of an interregional equalizing effect of land market transactions is therefore conditional on the strength of these customary restrictions protecting intra-community ownership.

As the foregoing discussion shows, the net impact of land sales on the distribution of land is a priori indeterminate since there are different effects running into opposite directions. It is therefore an empirical matter to decide whether land distribution can be made more equal through land market development. Unfortunately, there is a dearth of empirical studies that systematically address this question, and our knowledge on this point remains quite limited.

The present paper is a step in the direction of filling this gap. More specifically, we intend to measure the effect of land sale transactions on land distribution by looking at the situation prevailing both at the intra- and at the inter-community levels. Towards that end, a

set of original household and village data collected in 36 villages of Central Uganda will be used. This region is well suited to our purpose for two reasons. For one thing, Uganda is a country with a well-known tradition of land market activity that dates back to colonial times and the Buganda kingdom, so that purchased parcels of land constitute an unusually high proportion of farm size. For another thing, population density varies widely within rather short distances (and within the same ethnic group), and is fairly high (reaching 300 inhabitants per square kilometer) in some parts of the sample area.[3] Large migratory movements are observed throughout this area, enabling us to assess the impact of land market development on inter-community transfers of land assets.

The structure of the paper is as follows. In Section 2, the methodology of our field research in Uganda is explained and some important characteristics of the study sites are highlighted. In Section 3, the impact of land market on land distribution is investigated in several steps that include the presentation of preliminary statistical evidence, the specification of the econometric model, and the discussion of the econometric estimates. Section 4 concludes the paper.

2. Methodology

We used a multi-stage stratified sampling method to select 36 villages in five districts of East-Central Uganda: Iganga, Kamuli, Luwero, Mukono and Mpigi. Stratification has been based on two criteria: population density and two different tenure regimes. The sample area is particularly appropriate for the application of this method since it allows for wide variations in population pressure within the two coexisting tenure systems.

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[3] Note that these population gradients are found within the same ethnic groups allowing us to substantially control for ethnicity in our analysis.

The southernmost sites are located in a highly favourable agro-climatic zone where there are two rainy seasons and coffee is a major crop. The climate changes fairly rapidly when moving north and eventually becomes quite dry to the north of Luwero, Mukono, and Kamuli Districts. There is only one rainy season in these sites and crops such as sorghum and cassava are therefore the main staples. Population densities vary in accordance to these agroclimatic variations, ranging from 9 to 502 per square kilometre in our study sites. Such wide co-variations of agro-ecological zone and population density enable us to assess the impact of growing land scarcity on land market development and interregional migrations.

The two tenure systems covered by the study are the customary system practiced by the Busoga to the east and north of Kampala (in the districts of Iganga and Kamuli) and the mailo system prevailing among the Buganda to the east, north, and south of the same city (Mukono, Mpigi, and Luwero).[4] In customary areas, land was historically divided among clans. The clan would in turn allocate land to households based upon need (i.e. consumption requirements and labour resources). Once allocated, land could be used indefinitely by families and was transferred from father to sons through inheritance. Other clan members generally retained some rights to household land, such as grazing, firewood collection, and approval of certain land transactions. In areas of high population pressure, local commons have gradually vanished, land rights have become more individualized, and land sale transactions have multiplied.

Prior to 1900, all rural land in Uganda was governed under traditional customary tenure systems. Around 1900, the British, in an attempt to coopt the assistance of traditional rulers, demarcated large areas of land and gave legal title over these lands to chiefs, among whom was the Kabaka or chief of the Buganda, and other notables. In the Buganda Kingdom where most of this occurred, the mile was used as a unit of measure and the resulting 'private'

tenure system became known as 'mailo' tenure. The recipients of large land parcels quickly partitioned their estates to rent out tiny parcels to tenants against the payment of a fee. Under increasing population pressure, they continued to convert their woodland into agricultural parcels destined for tenants. In order to protect the latter's rights, the colonial government later passed legislation prohibiting eviction without due compensation. This led to long-term tenancies, known as *kibanjas*, which have since been transferred through inheritance or sale to other tenants (West, 1972; Noronha, 1985).

In 1975, all land, whether mailo or customary, became state land under the Land Reform Decree and was leased to occupants for a maximum of 99 years. Since the decree was never fully implemented, however, its practical impact was rather limited. Customary tenure "remained in its usual state of limbo" (McAuslan, 2000) and, in mailo lands, insecurity of rights was increased rather than reduced: as rents were declared illegal, further settlement of tenants was discouraged while tenants' rights became varied and uncertain, particularly in the case of absentee landlordism. At the same time, ambiguity of the government's plans to settle overlapping tenure has created uncertainty among mailo owners as well (Kisamba-Mugerwa et al., 1989; Muhereza, 1992; Bikaako, 1994).

In the Buganda area, some public lands (formerly called the 'Crown lands') were reserved by colonial authorities. With the exception of gazetted areas for buildings, forests or parks, these lands were de facto administered by chiefs, until chiefdoms were abolished in 1966. Households were progressively allowed to settle on these lands, to be joined later by squatters in response to population pressure. Under the 1975 Land Reform Decree, the customary land (former Kabaka land) and Crown lands were treated similarly in the Buganda region and we refer to this as public land tenure. Through the Land Commission, the state exercised increasing authority over these lands, especially those located close to Kampala,

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[4] Administrative boundaries were established around these tenure patterns, which also reflect traditional kingdom boundaries. For instance, the Kabaka, the ruler of the Muganda, had authority extending to Mukono in

and began to grant leaseholds of varying lengths, mostly to well-connected individuals from the urban elite (see, e.g., Kafureka, 1992). These newly leased lands have often been occupied and cultivated by squatter families. The latter faced an uncertain future, as they enjoyed no legal protection against arbitrary eviction, while an increasing number of leaseholders asserted their individual rights on the land, typically by fencing off their properties (Barrows and Kisamba-Mugerwa, 1989).

With the advent to power of President Museveni and its National Resistance Movement in 1987, new efforts at clarifying the legal structure of land rights in the country have been pursued. The new strand of land policy is clearly oriented towards the establishment of a uniform system of land tenure based on freehold tenure: according to the 1998 Land Bill, indeed, the solution to landlord/tenant relations on mailo land is left to market forces while the government facilitates leasehold enfranchisement and customary tenure is being phased out as freehold titles (whether under the form of certificates of ownership or of duly registered titles) replace occupation under customary law. The latter change is the most revolutionary since it virtually implies the elimination of public land as a category of land in Uganda: as a result, the customary tenants on public land are no more subject to the whims of officials willing to grant the land which they occupy to whomsoever they see fit or will pay (for examples of this, see Bazaara, 1992). Regarding leasehold enfranchisement in respect of leases of public land, unfortunately, no effort was made to address the issue of the potential conflict of land rights between customary occupants of leasehold land and the leaseholder (McAuslan, 2000).

As a concession to Buganda, mailo land has been restored. Yet, the provisions of the Bill are designed in such a way that owners of land in Buganda "retain their freehold title but lose virtually all effective rights of ownership in the land". This is because the occupants

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acquire rights of permanent occupation, subject to paying a nominal rent, and they are able to deal with the land as they see fit (which includes the possibility to sell their occupancy rights), subject to very limited rights of refusal by the landlord. Such a reduction of landlords' rights to bare ownership is the fulfilment of a political promise made to the occupants and tenants during the guerrilla struggle that led Museveni to power (McAuslan, 2000). In such conditions, one can safely predict that prospective buyers will be discouraged from buying mailo land while there is no reason to expect the same discouragement on the part of prospective tenants.

In our sample, three levels of population density (low, medium, and high) have been distinguished with the help of the 1991 census reports. For each tenure system and range of population densities, villages were randomly selected, leading to a sample of 36 villages characterized as follows: 14 villages of low population density, 11 of medium density and another 11 of high density. Half of the villages are under the mailo/public tenure system, and the other half under the customary system. Note that, in relation to the surrounding mailo lands, the area under 'public tenure' is small in our study sites.

Two distinct questionnaires were administered to collect the required data for this study. One included both open-ended and closed questions destined for an expert group of the village, made up of elders, local leaders (e.g., Local Committee Chairmen) and field agricultural officers. Males and females were present at nearly all interviews. The questionnaire contained seven sections, devoted to the following themes: population and demography, infrastructure and agricultural characteristics, access rights and restrictions on non-farm resources, processes of land conversion, land transactions and disputes, land markets, and informal social security mechanisms.

Households surveys were separately administered[5]. They contained a number of sections including household type and composition; livelihood activities; wealth indicators; access to off-farm resources; landholdings and inheritance patterns; land transfers and land rights; household decision-making; agricultural investments and land improvements. Households were selected using a pseudo-random procedure (e.g., we retain every 4th, 8th, 12th, etc, household in a certain direction). We conducted on average 10 interviews in each of the 36 villages. Once unreliable and atypical interview data are dropped, the final sample reduces to 300 households.[6]

3. The impact of land markets on inequality in Uganda

3.1 Preliminary evidence

In our sample, several indicators confirm the prevailing view that rural land markets are extremely active in Uganda, compared to most countries in SubSaharan Africa. Thus, 47 % of the total land area owned (and 45% of the total farm size) have been purchased, a figure which is very close to the proportion of 45 % found for the areas of Mpigi (central Uganda) and Kabale (southern Uganda) by Place (1995). This measure of land market activity does not

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[5] Due to limited resources, only one day was planned in each village. The day before, a driver would inform the village that a group of researchers would be arriving the following day. The driver would drop off the enumerators and help to bring the group together in a suitable location. He would then proceed to the village for the next day. One well-experienced enumerator would administer the group interview. This would last between two and three hours. The remaining three enumerators would spend the time interviewing about 3 households each. Each household interview lasted on average 1.5 hours.

[6] Out of the 360 household interviews, 29 were dropped as incomplete or in some cases unreliable. Moreover, we have excluded 31 households because the corresponding data appeared to us to have been generated by a different process than the data of the remaining households. These 31 excluded units exhibited at least one of the following characteristics: to have inherited more than 21 acres (this is true of 10 households); to have acquired more than 30 acres through purchase (4 households), rentals or borrowals (5 households); to have acquired more than 8 acres through other means than purchase or inheritance; to have more than 63 brothers; to have more than 35 members in the current household, or to possess a livestock herd of more than 80 heads. One

seem to be related to population density[7], although it varies a lot from one village to another (from 3 % to 89 %). The intensity of land market activity is also reflected in the fact that half of the households have farms comprising at least one purchased parcel.

Critical to the question of the distributive effects of land market activity are the characteristics of the buyers. In particular, we want to know whether there is any relationship between purchases in the land market, initial endowment and migratory status. Let us first clarify the way we measure migratory status, on the one hand, and initial endowment, on the other hand. Following the usual practice[8], we have constructed the questionnaire so as to elicit information about the mode of acquisition of all land parcels presently operated by the sample households (gift and inheritance, purchase, rental and borrowal). We also collected information on the land endowment and native place of the household head's father. A household head is considered to be a migrant if (1) he did not inherit any land in the village of his present residence, and (2) if his father was not born in it. Next, we need to measure initial endowment. For autochthonous farmers, we define an initial endowment as the sum of different components. First, for household heads whose parents are dead, we add up all the inherited parcels, while for those whose parents are still alive, we take the parcels which have been permanently given to them by their parents (*inter vivos* transfers). Such gifts are actually an anticipated inheritance, which will be duly taken into account when the final inheritance settlement occurs. They typically constitute the major part of the inheritance share of each married son. To correctly measure the initial land endowment, we should also consider

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can reasonably argue that, when key variables take on such extreme values, household decisions are determined in a particular way that does not reflect standard behaviour.

[7] Attempts to explain variations in land market activity by fitting econometric models have failed, due to the small size of our sample (36 villages). The only variable which appears to affect land market activity is the proportion of inhabitants who work outside the village: the corresponding coefficient is positive but significant at only 8 % level. All the other village level variables –type of indigenous tenure (mailo or non mailo lands), population density, soil quality, incidence of off-farm incomes, proportion of villagers with cattle– do not have any significant effect.

[8] Information based on recall methods tends to be unreliable, particularly when related to the distant past. The questionnaires also tend to produce unreliable information when too long and too 'repetitive' on related topics.

parcels which were inherited and have been sold (or given away permanently) in the past. Our data on land sales, however, do not contain information about the mode of acquisition of the parcels sold or given and we cannot rule out the possibility that some parcels sold have been acquired through purchase. Therefore, by adding all the parcels sold or given, we tend to overestimate 'initial endowments'. We have good reasons to believe, however, that in our sample the bias thus created is negligible. As a matter of fact, it appears that very few sales were motivated by consolidation or speculation purposes: an overwhelming majority of land sales occurred under distress conditions.[9] Since such sales were made by poorer households with little ability to purchase land, parcels sold in this way are likely to have been inherited.

Note that all the major results presented in this study continue to hold if we adopt a definition of initial endowment that excludes parcels sold in the past. This is not surprising since the two measures are very close (the correlation between them is as high as 96%).

So much for the initial endowment of an autochthonous farmer. Regarding migrants, we define an initial endowment as the amount of land they have inherited in the village of their father. In the absence of a direct measure, this amount is inferred by dividing the father's farm size by the number of male inheritors in the family. This is an acceptable procedure since equal division of land property is the standard inheritance practice in patrilinear systems in Sub-Saharan Africa (see Platteau and Baland, forthcoming). Our data about inheritance patterns in the sample villages confirm that this practice is largely dominant.

To assess the impact of the land sale market on the initial distribution of land endowments both for indigenous and migrant farmers, we begin by drawing the Lorenz

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We have therefore privileged more precise information on currently observable characteristics, such as the size and origin of the field parcels.

[9] Thus, out of 34 reported sales, 8 were made to finance medical expenditures, 7 to repay debts and the remaining ones to meet "some other problem". The average income of the 34 households which sold land is subtantially lower than the income of those which did not (188,000 against 267,000 ugandan shillings). It must nevertheless be borne in mind that, since land sales tend to be under-reported in questionnaire surveys, a more systematic analysis of land sale behaviour is not warranted.

curves that obtain before and after land purchases for the entire sample population. This is done in Figure 1 below:
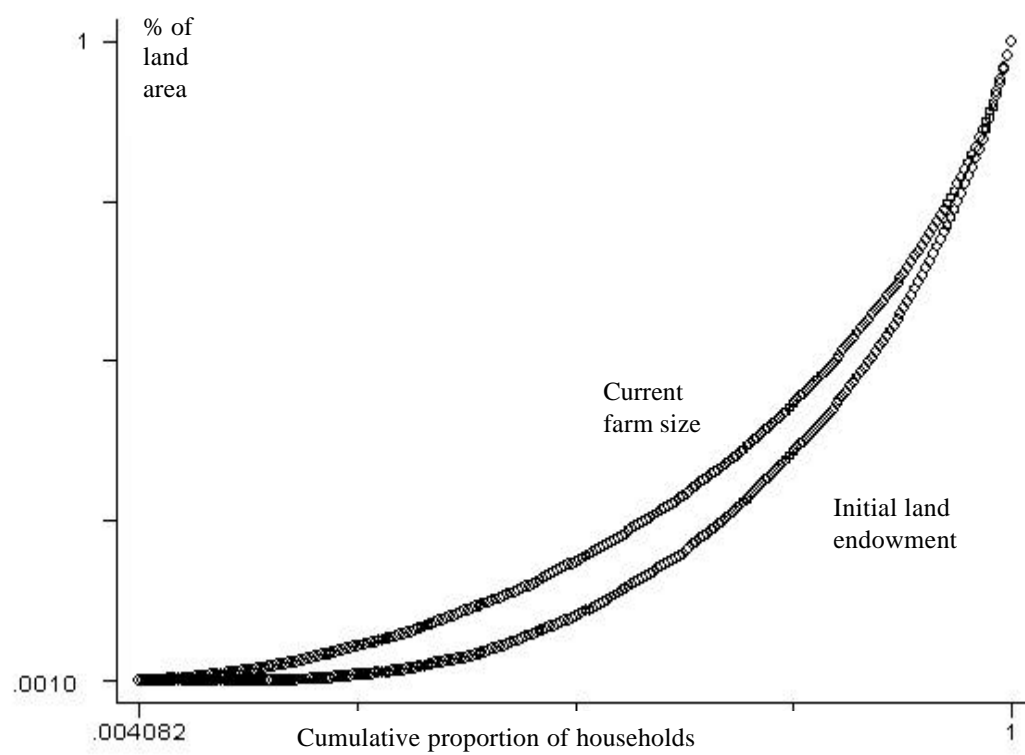
Figure 1: Lorenz curves of land distribution before and after land purchases

It is evident that land purchases have the effect of reducing, in a significant and unambiguous manner, the initial inequality in land endowments (for both migrant and indigenous farmers). This result is confirmed by the evolution of the Gini coefficient from 0.57 to 0.49 (see Table 1). Moreover, the decline of inequality in landholdings under the impact of land purchases (as measured by the Lorenz curves or the Gini coefficients) occurs whether we consider separately the autochthonous or the migrant population, yet is more important in the case of the former.

Table 1: Gini coefficient of inequality in land distribution

Category of land	Gini index for all farmers (n=294)	Gini index for migrant farmers (n=45)	Gini index for indigenous farmers (n=249)
Inherited land	0.57	0.50	0.57
Inherited land + purchased land	0.49	0.46	0.50
Farm Size	0.47	0.48	0.46

If we also consider the impact of the temporary acquisitions of land through rentals or borrowals and of the (few) permanent gifts of land that cannot be treated as *inter vivos* transfers from parents to heirs, we obtain the Gini coefficients displayed in the last row of Table 1. It can be seen that this effect is less important than that resulting from land purchases, especially in the case of migrant farmers for whom it is actually (slightly) disequalizing. Given the rather small size of the migrant sample, the latter result has to be taken with some caution. That the impact of temporary acquisitions tends to be relatively weak is not surprising since temporary transfers of land are much less important than land purchases as a way to gain access to land: not only are they less frequent, but also the size of the parcels involved is much smaller. Thus, whereas as many as 151 out of 300 households

have made purchases, only 53 of them have rented in or borrowed land. The average size of a purchased parcel is 3.9 acres while that of a rented-borrowed parcel is only 1.5 acres (the difference is statistically significant at the 99% confidence level).[10] As a result, while 39% of total land area in our sample has been purchased, only 11% has been rented or borrowed.

An important caveat is in order here. Since our data are collected directly from the sample villages, we have no information about people who were born with little or no land endowments and were forced to leave the area for lack of access to land. As a result, the equalizing pattern of land distribution that we observe concerns only those farmers who could stay in the village. This data limitation of our analysis is not too important in the particular case of our study because we know from the community questionnaires that people who left the village are relatively few compared to those who have settled. On average, the area studied is thus a region of net immigration.

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[10] Note that the average size of an inherited parcel is 4.3 acres.

3.2. The econometric estimation procedure

The evidence presented in the previous section suggests that land-poor people are able to partly compensate their low initial endowments by acquiring land through the market. The interesting question to ask now is whether heterogeneity in exogenous factors between rich and poor households account for the observed equalizing effect, or whether such effect is to be attributed to some intrinsic characteristics of the land market. Among those exogenous factors, one finds non-agricultural income opportunities, household size, proximity to urban markets or population pressure on land. The answer to that question is not straightforward since decisions to buy land, to rent it in, and to migrate to another rural area are interrelated and can be ultimately derived from the same decision making process. We therefore need an econometric model that makes those interrelationships explicit.

Our estimation strategy is based on the following hypotheses. First, land purchase decisions are determined by the difference between the household's land endowment and its optimal farm size, yet the adjustment is not perfect owing to the presence of transaction costs. Second, land rental decisions are treated as a substitute for non-realized purchases, and the land rental market is also pervaded by transaction costs. Third, while being a migrant or an indigenous farmer affects access to local land markets, the causality also works in the reverse way in so far as the expected individual ability to get access to land through purchases or rentals influences the decision to migrate in a particular village. In short, there is an endogeneity bias in the migrant variable.

Equation (1) in the model describes how the optimal farm size, denoted L^*, is determined. It is a function of a vector of exogenous variables, denoted X, that comprises soil quality, population density, land endowment, education, and household size. Note that household characteristics are presumed to bear upon the optimal farm size because market imperfections are probably operating to prevent optimal adjustments from taking place through land, capital or labour exchanges (see, e.g., Collier, 1983; Binswanger and Rosenzweig, 1986; Carter and Wiebe, 1990; Sadoulet and de Janvry, 1995).

(1) $L^* = a + bX$

Equation (2) indicates that the function of actual land purchases, denoted by P, is to bridge the gap between the initial endowment in land, E, and L^*, the optimal farm size. We therefore expect the coefficient d to be positive. Furthermore, since, due to market imperfections, a household is never in a position to buy enough land to reach its optimal farm size, d is hypothesized to be smaller than 1. This is precisely the test carried out by Skoufias (1995) in his analysis of transaction costs in land markets in India. Characteristics that reflect market imperfections presumed to impinge on actual purchases are the following: (i) migrant status, M, since people are often keen to defend their customary land against acquisition by strangers; (ii) main tenure regime, T, since the total security granted to tenants on mailo lands presumably reduces the profitability of acquiring ownership of those lands; (iii) access to off-farm income sources, Y, since imperfect credit markets make such access critical for obtaining the necessary liquidity and (iv) the age of the household's head, A, (and, to allow for non-linearities, the square of this age, A^2). Regarding the latter, market imperfections that limit land purchase plans, such as credit and liquidity constraints, or social prestige considerations and reputation effects, can be assumed to be more constraining for the younger farmers.

On the other hand, it bears emphasis that, by definition, migrants have no initial land endowment in their destination village (*E=0* for them), yet they are likely to have inherited land in their native village, which they could convert by purchasing land in their present location. Hence, land inherited by migrants in their native village, *I*, is introduced separately into equation (2), where it is intended to measure a wealth (or liquidity) effect for migrant farmers. Lastly, we want to test whether landless indigenous farmers have a privileged access to the local land market, by virtue of prevailing social norms guaranteeing a right of subsistence to all community members. For that purpose, we will use a dummy, *LL*, equal to one when an indigenous farmer has no initial endowment, so that we expect the associated coefficient, *f*, to be positive. We therefore have:

(2) $P = c + d(L^*-E) + eI + fLL + gM + hT + kY + lA + mA^2 + u$ *if L*-E>0,*

$P=0$ *otherwise,*

where *u* stands for the error term. Note also that data related to land sales are not reliable as they seem to grossly underestimate the real extent of such transactions (a well-known problem in surveys of land, and credit, market transactions).[11] As a result, the dependent variable in equation (2) is constrained to be positive.

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[11] The under-representation of land sales (and rentals) in our sample data is to be ascribed not only to the well-known fact that a comparatively large proportion of land sellers are found in urban centers (where they cannot be reached for interview) while buyers tend to live in the villages, but also to our data collection strategy. As a matter of fact, we focussed on the modes of acquisition of the different parcels that make up the land area actually cultivated at the time of the survey. Land sales were recorded in a separate section of the questionnaire, using the recall method and with few possibilities of crosschecking the reliability of the data.

Equation (3) is based on the idea that land rentals, *R*, are motivated by the desire to adjust the size of the farm when the parcels permanently acquired are smaller than the optimal size. As in the land sales market, various imperfections prevent land rentals from substituting perfectly for non-realized purchases, *(L*-E-P)*, so that we expect the coefficient *p* to be positive, but smaller than one. Like in the case of the land sales market, land rentals are fraught with various imperfections which are influenced by migrant status, *M*, tenurial regime, *T*, access to off-farm income sources, *Y*, and the age of the household head, *A* (and A^2). Regarding the latter, there is a double impact of age on land rentals and they both go in the same direction. On the one hand, there is the residual effect arising from the aforementioned fact that access to the land sale market is more difficult for relatively younger farmers. Hence their greater need to resort to the land rental market as a substitute for land purchases. This effect is captured by the 'non-realized purchase' variable. On the other hand, there is a separate effect in so far as young farmers are less likely to have received their inheritance share (in full) as a *premortem* transfer, and they are therefore compelled to have a temporary recourse to the land rental market in order to reach a viable farm size. It is because we also want to measure this effect that the age variable is introduced separately in the following equation.

(3) $R = n + p(L*-E-P) + qM + rT + sA + tA^2 + v$ *if L*-E>0,   R=0 otherwise*[12].

---

[12] We consider that when *L*-E* is positive, *L*-E-P* is also positive because a farmer will not purchase land, if he needs to do so, in excess of the optimal farm size. Technically, the inequation *L*-E-P>0* is problematic since *P* is an endogenous variable in our model.

To allow for the above-noted endogeneity bias in the migrant status variable, we need to use a two-stage econometric procedure.[13] Since the migration variable is discrete and since the purchase variable is censored, two-stage least squares methods are inadequate. We will nevertheless use conventional methods appropriate to the kind of data available –the Probit model for the discrete dependent variable and the Tobit model for the censored dependent variable–, yet with instrumental variables to correct for endogeneity biases. Mallar (1977) has established that such a procedure yields unbiased coefficients but that standard errors are not correctly estimated. Hence the need to resort to bootstrapping to construct confidence intervals. Note that, as it turned out, the standard errors directly computed by the Tobit model (even without an adjustment for the two-step procedure) are not perceptibly different from the more theoretically consistent ones obtained by bootstrapping.

The second-stage model describing migrant behaviour, where M^* stands for the latent migration variable, P^* for the latent purchase variable, W for a set of exogenous variables that affect migration decision, and w for the error term, is as follows:

(4) $\qquad M^* = \boldsymbol{a} + \boldsymbol{b}W + \boldsymbol{g}P^*,$

(5) $\qquad \Pr(M) = F(M^* + \boldsymbol{n}).$

The vector W comprises variables that refer to personal characteristics of the migrant as well as to features of its destination. The first subset comprises age and education of the household head, while the second subset includes soil quality, population density, tenure regime, distance to urban market, availability of employment opportunities and land market activity.

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[13] This procedure also settles the issue of unobserved characteristics that are specific to migrants (willingness to invest, intertemporal preferences,…) and might be correlated with the residuals of equations (2) and (3).

Let us now re-write equations (2) and (3) in a testable form, after substituting L^* as obtained from equation (1), and after allowing for the endogenous character of the migrant variable (it is therefore a second-stage equation). Equation (6) gives the definition of non-realized purchases, Z, which is, up to an additive constant, equal to the difference between the optimal farm size and the initial endowment augmented by land purchases. This variable is then used to re-write equation (3).

$$(2') \qquad P^* = d + eX + fE + jI + hLL + cM^* + kT + lY + mA + xA^2$$

$$(2'') \qquad P = P^* + u \text{ if } P^* + u > 0, \ P = 0 \text{ otherwise.}$$

$$(6) \qquad Z = \frac{-e}{f}X - E - P \qquad \text{if } \frac{-e}{f}X - E - P > 0, \ Z = 0 \text{ otherwise.}$$

$$(3') \qquad R^* = v + qZ + JM^* + rT + yA + wA^2 + t$$

Note that, up to an additive constant, the optimal farm size, L^*, can be estimated from (2') since $b = -e/f$.

3.3. Econometric results

We present below the successive estimates of the three second-stage equations (4), (2') and (3'). The Probit estimate of the determinants of migrant status is given in Table 2. The dependent variable, *migrant* (denoted by M in the previous section), is a dummy with value 1 when the farmer has not inherited any land in the present location and his father was not

born in it. Among the determinants, *age* is the age of the household head in years, *educprim* and *educsec* are dummies measuring completion of elementary and secondary level education, *propcass* is the proportion of village area planted under cassava (used as an indicator of poor soil quality), *popdens* is the average population density in the village (in natural logarithm), *mailo* (labelled *T* in the previous section) is a dummy with value 1 when the village land is under the mailo tenure regime and with value zero otherwise; *activ* measures the activity of the local land sales market and corresponds to the village-level proportion of land owned by non-migrants (so as to have an index independent of the migratory phenomenon) that was acquired by way of purchasing, *disttown* is the distance in kilometers between the village and the nearest urban center, *workopp* is the village-level proportion of households having at least one off-farm employment, and *pursim* is the simulated value of the land purchase variable as obtained from the first-stage equation.

Table 2: Probit estimate of the determinants of migrant status

```
                                      Number of obs   =         294
                                      LR chi2(10)     =       38.30
                                      Prob > chi2     =      0.0000
Log likelihood = -113.31255           Pseudo R2       =      0.1446
-------------------------------------------------------------------------------
migrant |     Coef.   Std. Err.      z     P>|z|   [90% bootstrapped interval]
--------+----------------------------------------------------------------------
constant |  -1.71077   .8561237    -1.998   0.046
     age |    .00033   .0068761     0.048   0.962     -.011214      .013622
educprim |  -.1454852  .2548977    -0.571   0.568     -.584517      .362785
 educsec |  -.4406638  .3315059    -1.329   0.184    -1.215453      .156014
propcass |   .4822376  .5386827     0.895   0.371     -.358593     1.397927
 popdens |  -.1126763   .141321    -0.797   0.425     -.370076      .123922
   mailo |   .3843036  .2123144     1.810   0.070      .078681      .859603
   activ |   2.544745  .7332915     3.470   0.001     1.409966     4.157235
disttown |  -.0114875  .0142187    -0.808   0.419     -.044262      .013523
 workopp |   .1129892  .4321456     0.261   0.794     -.637923      .856772
  pursim |   .0410138  .0308852     1.328   0.184     -.004626      .090229
-------------------------------------------------------------------------------
```

The most impressive result that emerges from Table 2 and the estimated bootstrapped confidence intervals is the highly significant positive impact of *activ* on *migrant*: clearly, migrants move preferentially to places where the land market is particularly active. The latter

result is all the more meaningful as land activity has been assessed irrespective of land transactions in which migrants have themselves been involved (see supra). The positive sign associated with the mailo variable indicates that the mailo region is favoured by migrants. The absence of any influence coming from education is not surprising if we bear in mind that what we consider here are movements to other rural areas and not to cities. Likewise, the fact that *age* does not influence migration is to be ascribed to the nature of our data which measure the current age of the farmer at the point of destination and not his age at the time of migration. Lastly, it is worth noting that the effect of the intrinsic ability of an individual to purchase land (as measured by *pursim*) on his decision to migrate is close to significance (at the 90% confidence level).

The Tobit estimate of the determinants of land purchases is shown in Table 3. The dependent variable, labelled *P* in the previous section, is named *purarea* and is measured in acres. The exogenous variables that still need to be defined are: *inhland* corresponds to *E* in the previous section and measures in acres the land endowment of indigenous farmers (as discussed in Section (3.2)); *landless*, denoted by *LL* earlier, is a dummy with value 1 when the farmer is an indigenous inhabitant who did not inherit any land from his father, and with value 0 in all other cases; *endowmig*, denoted by *I* above, measures in acres the land inherited by migrants in their native village (see Section (3.2)); *hhsize* is simply obtained by adding up household members; *extinc1* is a dummy measuring access by at least one member of the household to an occasional off-farm employment while *extinc2* measures access to a regular off-farm activity; finally, *migsim* is the simulated value of migrant status as obtained from the first-stage equation.

The central result of the paper emerges from this table: land sales transactions have an equalizing effect on land distribution. There are actually two mechanisms underlying this result. First, people who did not inherit land are able to compensate their initial disadvantage

through market purchases, and, second, for those who did inherit land, the market partly corrects inequality in initial endowments. Indeed, the coefficients of *landless* and *inhland* are highly significant and have the expected sign. Moreover, the coefficient associated with *landless* is noticeably high: other things being equal, an indigenous household which did not inherit any land purchases 5.7 acres more, on average, than a household which did inherit (bear in mind that all migrant farmers in our sample have inherited land in their native village). By contrast, as seen from the coefficient associated with *inhland*, for an indigenous farmer who did inherit, any additional acre of land obtained upon bequeath reduces the amount of land purchased by 0.37 acres.

Table 3: Tobit estimate of the determinants of land purchases

```
                                    Number of obs   =        294
                                    LR chi2(14)     =      90.39
                                    Prob > chi2     =     0.0000
Log likelihood = -554.98841         Pseudo R2       =     0.0753
---------------------------------------------------------------------
 purarea |    Coef.   Std. Err.      T     P>|t|  [90% bootstrapped interval]
---------+-----------------------------------------------------------
constant | -9.959959    5.53672   -1.799   0.073
 inhland | -.3679863   .1407243   -2.615   0.009    -.7092083    -.1022998
landless |  5.678925   1.323327    4.291   0.000     3.785462     7.863806
endowmig |  .9661527   .4020885    2.403   0.017     .2252214     1.717117
     age |  .5664775   .1707541    3.318   0.001     .2851621     .8550557
    age2 | -.0044174   .0015713   -2.811   0.005    -.0072246    -.0019426
  hhsize |  .2644075   .0816904    3.237   0.001     .1174077     .4010252
 educprim|  1.630664   1.178506    1.384   0.168    -.4371427     4.084908
  educsec|  4.005636   1.439044    2.784   0.006     1.563737     7.070438
  extinc1| -.5375984   1.034373   -0.520   0.604    -2.227564     1.241323
  extinc2|  .9080126   1.747784    0.520   0.604    -2.027263     3.301706
  migsim |  2.002444   .8633135    2.319   0.021     .8668108     3.354451
 propcass| -4.462888   2.659364   -1.678   0.094    -9.665819    -.0432672
 popdens | -1.206416   .6289855   -1.918   0.056    -2.258387    -.3253616
   mailo | -3.235347   1.009161   -3.206   0.002    -4.915684    -1.436771
---------+-----------------------------------------------------------
```

Another interesting result is that there exists a strong wealth effect for migrant farmers: the coefficient of *endowmig* is close to one and highly significant, implying that migrants can perfectly substitute land purchased in the host village for land inherited in the native village. In the same connection, it bears noting that, controlling for all other factors, migrant farmers purchase more land than indigenous ones. These two findings suggest that migrant farmers in

central Uganda are not discriminated against in local land markets. An interesting question which arises and for which we cannot provide an answer given the limitations of our data is whether the non-discriminatory operation of rural land markets in Uganda has helped stimulate migratory movements, or whether the long tradition of rural-rural migration in this country has instead caused land markets to develop in a neutral, anonymous manner.

Among the other determinants of land purchases that presumably reflect transaction costs, we observe that the older the farmer the easier his access to land through purchases (the relationship is concave and remains positive in the relevant interval). As we have pointed out earlier, such age-based discrimination probably arises from liquidity constraints and absent credit markets. However, and contrary to what André and Platteau (1998) found in Rwanda, availability of non-agricultural incomes does not have any impact on the household's ability to purchase land. Such a finding is surprising in the light of the other evidence provided in this paper, which suggests that access to liquidity severely constrains land purchases. This may be due to our using a rather rough measure of access to liquidity through off-farm employments: not only we do not measure external incomes continuously, but also we amalgamate cases where only one member of the household earns money outside with cases where several members exhibit this characteristic. In addition, and perhaps more importantly, there is a lack of intra-village variability in our *extinc* variables, which may explain their poor performance in explaining access to land markets within villages. (By contrast, the study of André and Platteau focussed on a single village.)

Regarding the impact of tenure security on land purchases, we find the expected result that such purchases are less frequent in the mailo area (note that they also concern smaller parcels): the rights of permanent occupation granted to the occupants of mailo lands under the Land Bill of 1998 tend to make ownership of these lands much less attractive than it is outside the mailo area.

Other variables tested in the regression pertain to the determination of the optimal farm size. Interestingly, secondary level education has a highly significant and positive impact on the size of the farm, and hence on the extent of land purchases. This probably reflects the fact that more educated farmers have better management skills. As expected, farm size is also larger the bigger the household (*hhsize*), the lower the quality of the soil (*propcass*), and the lower the density of population (*popdens*). Regarding the latter, note that as population density doubles (bear in mind that density is measured in log), the size of the purchased parcels shrinks by 1.2 acres, and the optimal farm size is reduced by 3.24 (=1.2/0.37) acres. Obviously, as population density rises, the average amount of land available per household diminishes, land prices are higher, and one therefore expects parcels exchanged on the land market to be correspondingly smaller.

The Tobit estimate of the determinants of land rentals and borrowals is presented in Table 4. The dependent variable, *temparea*, is the amount of land in acres that is currently borrowed or rented in by the household. Among the exogenous variables, the only one which still needs to be defined is *unreal*, the unrealized land purchases, which correspond to Z in the econometric specification.

Table 4 : Tobit estimate of the determinants of land rentals and borrowals

```
Tobit estimates                                  Number of obs   =        294
                                                 LR chi2(5)      =      45.50
                                                 Prob > chi2     =     0.0000
Log likelihood = -185.99856                      Pseudo R2       =     0.1090
-------------------------------------------------------------------------------
temparea |      Coef.   Std. Err.       t    P>|t|   [90% bootstrapped interval]
---------+---------------------------------------------------------------------
constant |    5.515399   1.854188    2.975   0.003
  unreal |    .3873391   .1219787    3.175   0.002      .2132446      .654917
     age |   -.2453824   .0763709   -3.213   0.001     -.3595883    -.1123503
    age2 |    .0019199   .0007247    2.649   0.009      .0004171     .0030853
  migsim |    .6590904   .3703886    1.779   0.076      .0924688     1.335182
   mailo |   -.0278381   .4547922   -0.061   0.951     -.8090405     .6313679
---------+---------------------------------------------------------------------
```

The hypothesis according to which land rentals and borrowals constitute a residual adjustment for non-realized land purchases seems to be confirmed in the above estimate: the coefficient of *unreal* is positive and highly significant.[14] We can interpret this finding in the light of our model as additional evidence that land markets help to compensate inequalities in initial endowments: a farmer with one acre less of initial endowment is able not only to purchase 0.37 acres more of land in the sales market, but also to acquire $(1-0.37)x0.38 = 0.23$ acres more of land in the rental market.

Unlike what we observed with respect to land sales, the tenure regime has no impact on temporary land exchanges. This is according to our expectations since the severe limitations upon ownership rights in the mailo area ought not to discourage prospective tenants from acquiring leasehold rights. On the other hand, and again in conformity with our expectations, age has an influence on land rentals and borrowals: younger farmers participate more in the land rental market than older ones, because they are not yet in possession of their entitled share of family land assets. Finally, there is possibly a positive relationship between being a migrant and land rental transactions.[15]

5. Conclusion

Under the combined impact of population growth and agricultural commercialization, land rights become more individualized, implying that land market activity increases. The pessimistic scenario has it that when such a process occurs inequality is likely to increase in

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[14] To be sure, we have also tested a model where purchases are considered as a substitute to non-realized renting, but expectedly the performance of such a model is as low as its theoretical consistency.

[15] An alternative model was tested in which age is a supplementary determinant of the optimal farm size rather than an indicator of transaction costs. The purchase equation is of course unaffected but estimated non-realized purchases become insignificant in the rental equation, that loses moreover much of its explanatory power. This suggests that age is mainly a measure of transaction costs, while it does not affect the optimal farm size independently (i. e., when other factors such as household size are controlled for).

the sense that distribution of land worsens at the expense of the poorer population groups. The evidence from a sample of 36 villages in East and Central Uganda suggests a different, less worrying scenario: rather than leading to a concentration of land assets in the hands of a minority, the activation of the land markets has the effect of correcting initial inequality. As a matter of fact, a handicap of one acre in initial land endowment is on average compensated by an increase of about 0.75 acres of land acquired through the market. Half of this increase is achieved through the land sales market, and the other half through land rental and borrowals. Moreover, there is apparently no discrimination against migrant farmers in the way village-level land markets operate. We actually find that migrants are able to convert their entire initial endowments in the native village into lands purchased in the host village. These two central results have been obtained using an original econometric model based on the distinction between desired and actual farm size, treating land rentals as a residual adjustment, and allowing for the endogeneity of migratory decisions.

Our conclusions drawn from Central Uganda are therefore in stark contrast to the picture, much closer to the pessimistic scenario, obtained by André and Platteau (1998) for a village of western Rwanda. To understand this difference, it must be borne in mind that the situation encountered by these authors was much more extreme than that emerging from the present study. As a matter of fact, land hunger was much more acute in Rwanda (before the civil war) than in Uganda. While in the former country land markets have been activated under the pressure of extreme land scarcity driving poor farmers into destitution and landlessness, they have developed in the latter country largely as a result of rural-rural migratory movements motivated by the search for more fertile and abundant lands. Availability of land in some areas actually encouraged such movements in contrast to Rwanda where all land frontiers had been closed and it was even difficult for return migrants to retrieve their customary land.

An additional factor ought to be emphasized in comparing the results of Uganda to Rwanda. In Rwanda, indeed, land is fragmented into many non-contiguous plots. It may thus be easier for people to sell portions of their farms when it is in this form as opposed to when (like in Uganda) they have only one piece of land on which their homestead sits. If so, land may be more quickly considered as a source of cash during distress in Rwanda than in Uganda. Given these different contexts, it is not really surprising that the effects of land markets have been found to be much less disequalizing in Uganda than in Rwanda, for indigenous as well as for migrant farmers.

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