

Determinants of Household Participation in Land Rental Markets in Rural Kenya

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ABSTRACT *In this study we identify the determinants of the participation rural households in the land rental market in Kenya. On the basis of rural households from Laikipia district, we test a number of theoretical hypotheses on what determines the participation of households in land rental markets in Kenya. According to our findings, rental markets have important positive equity and efficiency effects in Kenya, despite existing imperfections. We find that land-poor households access land through the land rental market, and are able to access land through renting in than through sales markets. Policy attention should focus on issues which impede performance of rental markets to contribute to further efficiency improvements and poverty reduction in rural areas of Kenya.*

Key words: Kenya, land markets, efficiency, rentals

1. Introduction

Land reform has generated renewed attention because of its importance in promoting economic development in particular in redressing unequal land distribution and historical injustices in countries such as Kenya, Zimbabwe and South Africa. The discourse of the debate revolves around the need to reclaim indigenous land rights of communities that were displaced during the colonial settlement and those disenfranchised as a result of the implementation of land tenure reforms and land grabbing by the political elite.

In particular, the land invasions in Zimbabwe have catalyzed a renewed political interest and debate on the land question in Kenya. The Maasai pastoralists in Laikipia district are a good case in point¹. Such events pose two challenges to policy makers. First, land invasions are tantamount to the violation of the sanctity of land rights and the rule of law. They discourage the much needed foreign investment and integration into the global capitalist system. Second, much attention has focused on transfer of rights through titling land sales markets to allocate land. In an atmosphere with uncertainties and limitations in credit and factor markets, land markets are thin and limited to distress sales (Platteau 2000). In such circumstances land rental markets can play an important role in improving land use and access to those in need (Deininger and Binswanger, 2001). Access to land even if only through use rights has implications for effective utilization of family labour and improved nutritional status (Burgess 2001). In addition, there is emerging evidence and insights in the functioning of land markets and institutions that have attracted renewed attention to land access which is an important poverty reduction mechanism (de Janvry, et al., 2001).

In the past attention has been paid to land titling, transferability rights and the protection of land ownership enforced through public records and cadastral surveys. In reality, however, the process has been flawed. The public records and legal systems are inadequate in most poor countries and the process is easily manipulated by the powerful and well connected. For instance De Soto (2000) argues that the absence of a well functioning system for the protection of land ownership is the single largest impediment to growth in most developing countries. Consequently, the process has been

¹ In August 2004, police arrested hundreds of Maasai herders who had invaded white owned farms in Laikipia District, Kenya, (see the Daily Nation 26th August, 2004).

associated with the dispossession of the traditional land use rights of the poor especially the pastoralists, with heightened social tensions and uncertainty.

In poor countries land, plays a special role in livelihood and the general social structure of many people. For the poor rural households, even a small plot can be a critical element in a diversified livelihood system and can significantly reduce the risk of poverty and food insecurity. The role of land rental markets has been re-emphasized as critical for both efficiency and welfare reasons. Access to land allows households to use idle assets such as family labour, managerial and supervisory skills. Given the importance of land rental markets as a mechanism to alleviate poverty, improve nutrition and maintaining social peace there is need to deal with the issue. For these efficiency and welfare reasons it is important to understand how land rental markets function. This issue is of critical importance for Kenya where, a new draft land policy is being discussed. There is little indication that this option has been given serious consideration in the draft document. A discussion of the types of interventions that could help restore the role of land rentals as an instrument to give the poor access to land. From a theoretical perspective, an important function of the land market is to reallocate land in favour of more efficient users. It is a puzzling why the land market does not function that way. Policy makers are charged with the challenge of understanding better the factors that influence the emerging trend of land leasing, as well as giving incentives for proper utilization of land. A deeper understanding of the challenge is essential to formulate effective policy intervention. Few studies have tried to empirically explore this issue and this paper aims to contribute in addressing this gap.

We are interested in understanding the household decision to participate in land rental markets, which includes the characteristics of land ownership and land use. We probe how these characteristics affect the rural land market and small farmer's access to land. A shift to land rentals provides an alternative that will help increase efficiency in giving access to the poor and avoid disruption of economic activity through land invasions.

This study is the first to the best of our knowledge to provide a formal empirical analysis of land rentals in Kenya. Our work extends the literature in two ways: First, the traditional emphasis has been on ownership and titling. Second, by studying land rentals we provide crucial empirical evidence needed by policy makers

interested in setting rules and implementing land reform aimed at improving access to land to rural poor households. Such a mechanism would be expected to reduce bottlenecks in land leasing and encourage long-term investments in land improvements. A related issue is that the literature on rental markets has typically focused on sharecropping and on the relationship between large landlords and tenants (Braverman and Stiglitz, 1982; Bardhan 1989). While these studies are relevant for Kenya, the new market dynamics need to be studied and understood. There is an unfulfilled need for understanding this phenomenon, if land leasing is going to fill shortages of land.

The paper is structured as follows: Section two reviews the developments on emerging land rental markets in rural Kenya. Section three discusses the conceptual framework and estimation strategy to analyze the land rental decision. This is followed by a description of the study site, data sources and evidence of the descriptive statistics in section four. Section five discusses econometric evidence, while section 6 concludes with policy implications.

II. Land accession through the market

Arable land in Kenya is increasingly becoming scarce due to a rapidly growing population and continuous land degradation. Purchasing land is clearly a limited option since not only are the procedures complex but there is also very little land available for sale. The system is fraught with institutional rigidities and other transaction costs that make land purchase procedures lengthy, cumbersome and expensive. In addition, most people are poor and face lots of financial constraints. More important, there is an absence of a clearly defined national land policy for adequately addressing land purchasing in the country. Land administration and management is *ad hoc* and operates on an outdated legal framework (Ministry of Lands and Settlement 2004). An obvious result is the creation of new uncertainties and a proliferation of costly litigation matters. An emerging trend of accessing land is now through both formal and informal land rental markets. The formal acquisition of land is known as leasing.

Land Lease Policy in Kenya

Leasing arrangements are an important way of obtaining land through the market. A lease represents a voluntary transfer of possessory rights in property (the right of use)

for a limited period of time. In Kenya there are numerous laws and statutes governing the leasing of land including: the Indian Transfer Act (1882), the Registered Land Act (Cap 300) and the customary law system. The Indian Transfer of Property Act (ITPA) was part of an administrative infrastructure of land relations within the settler community. It was meant to consolidate settler grip on land matters pertaining to temporary land transfers, leases, mortgages and covenants. It applied to lands registered under the Crown Land Ordinances of 1902 and 1915; the Lands and Titles Ordinance of 1908 (currently cap 208), and the Conversion of Leases Regulation and Rules of 1960, (Okoth-Ogendo 1999).

Leasing of land offers several advantages. First, leasing arrangements can enhance efficiency by allowing gains from specialization. Second, renting land over buying requires less liquidity or access to credit. With credit imperfections in Kenya and other developing countries, this is an important consideration for poor rural households. Last, leasing contributes towards reducing inequality in land holdings and facilitating access to land for poorer households. The division of ownership and use, however, may create potential incentive problems for both landlords and tenants regarding optimal maintenance and use of the property. The problem is one of moral hazard, though it is sometimes referred to as the “rental externality” (Henderson and Ioannides 1983).

The choice between a cash rent lease and a sharecrop lease has dominated the economics literature for a long time. In both cash rent and crop share lease, property rights to land to the land are imperfect. The agreement whether formal or informal can only specify and enforce basic parameters such as acreage and type of crop. Important features such as soil nutrients and soil moisture cannot be enforced in a lease contract. In cash rent lease the farmer pays a fixed annual amount per acre of land and owns the entire produce. As a result he supplies his own inputs but may overuse any inputs provided by the landowner, including the un-priced land attributes of the land. In crop share lease, in contrast, the farmer does not pay any fee for use of the land but simply pays a predetermined share of the harvest of the crop to the landowner at the time of harvest. Leasing serves as a precursor to purchase in some situations. One can judge the land's quality and potential productivity.

Informal land rental

Many farmers in rural Kenya cannot afford to engage in the complex legal leasing arrangements discussed above because of several factors. First, finding land to lease may be difficult, since land markets are undeveloped and even the desirable plots may have been purchased before. Second, due to tenure insecurity there may be little or no motivation to invest in the land. Last, there are multifaceted and diverse informal laws that have been in place with regard to land leases. Under this system, there are informal rules, culture and community interpretations that define land governance systems across generations. Consequently, the majority of farmers are involved in informal land rental arrangements. An overriding objective of participating in the informal land market is the desire to increase production and income and hence the improvement of their welfare.

There are two main types of informally arranged land rental contracts in place. By far the most common and predominant is the cash rental, followed by share cropping. Share tenancy is very limited in the country though it is common among resident farmers with close social ties and with a low financial status. Unlike share contracts that are orally discussed, most cash rentals are based on written agreements sometimes involving the local administrator as a witness. The contracts are short term rarely exceeding two seasons. Land rental rates vary from one plot to another depending on size, soil fertility and scarcity of land in a region. In places where arable land is scarce and of high quality the farmers leasing out demand higher prices. In general because the land market is thin and fragmented, rental rates are geographically localized and dependent on the economic status of the households involved.

The reasons behind the existence of both types of informal contracts even in the same locality are not very clear. In the literature there are two strands of thought that may help explain the phenomenon. First, there are transaction costs and attitude towards risk. Studies from Asia have shown that there is greater preference towards share cropping in localities with greater social ties, Otsuka 1993; Otsuka and Hayami 1988). One can argue that in such settings the costs of monitoring, enforcement and the incentive to renege is small. In addition it makes a lot of sense for risk averse farmers to pool and share risks. Following those arguments the presence of cash rentals may be explained by an increase in transaction costs especially among farmers with distant relations.

Land held under short-term rental contracts is not used to grow permanent crops, (Croppenstedt and Mammo, 1996). Farmers also invest little in land conservation and improvement structures, probably because the likelihood of capturing benefits immediately is low. These results are in conformity with the findings in other countries such as Place and Hazell (1993) for Rwanda, Kenya and Ghana, Hayes et al., (1997). The evidence on application of new or improved technology is sparse. From Southern Ethiopia, Holden and Yohannes (2001) find that tenure insecurity does not preclude the application of inputs such as fertilizers. In terms of productivity, the evidence suggests a lack of productivity differences between tenure types, (Place and Hazell, 1993).

As we show below, informally arranged short- term land rentals markets are growing in the country. Informal land rentals have several advantages. First, the short-term nature of land transactions prevents farmers from accumulating land, which perpetuates inequality in Kenya. Second, it enables farmers who otherwise would not have access to land to get access to land and farm. Last, the process is an alternative way of transferring land from those with large holdings to those with smaller holdings in the least cost manner. There is thus a need for a multiplicity of studies across the country to document the nature of land rentals in Kenya. Given the emerging importance of land rentals, findings from these studies should inform policy makers to set a framework for land rentals.

III Conceptual framework and hypotheses

The underlying framework of our analysis is the land lease model of Bliss and Stern (1982). In the approach land rentals are explained as an adjustment mechanism of area cultivated in response to imperfections in markets for other factors of production. Suppose that farmer i owns F_i units of family labour, and A_i units of land. Suppose further that the market for labour is imperfect, and the desired cultivated area (C_i) is:

$$C_i = f(F_i, Z), \quad (1)$$

where Z_i is a vector of all other characteristics of the farmer.

Then the notional demand for land (D_i^*) in the land leasing market is;

$$D_i^* = C_i - A_i = f(F_i, Z) - A_i \quad (2)$$

The difference between actual and notional demands for land depends on the transaction costs in the land leasing market.

However, as Skoufias (1995) has shown that the adjustment attained by the land lease market could be incomplete because of transaction costs on the market itself. The model explicitly makes a distinction between households leasing in and households leasing-out. Whereas Bliss and Stern (1982) treated households non participant in the rental market as perfectly adjusted, Skoufias (1995) assumes that some of the households do not participate because of transaction costs. Given the existence of transaction costs which impede perfect adjustment, the effective net amount of land leased by the household D will differ from the notional land demand D^* . Following Skoufias (1995), this hypothesis can be stated as follows. Let the actual net amount of land leased-in is D_i , then:

$$D_i = h(D_i^*) = h(f(F_i, Z_i) - A_i) \quad (3)$$

Where $h(.)$ is the transformation function in the leasing market. Without any transaction costs on the land rental market, the observed amount of net land leased-in D would be identical to the notional net demand D^* . A Taylor approximation to equation (3) yields:

$$D = h' \frac{\partial f}{\partial F} F + h' \frac{\partial f}{\partial Z} Z - h'A + C \quad (4)$$

where $h' = \frac{\partial h}{\partial D^*}$ which is the slope of the adjustment function and C is a constant term.

We then get: $D = \beta_f F + \beta_z Z + \beta_A A$.

The resultant empirical model is a simultaneous system of equations:

The household leases-in land ($D > 0$)

$$D^+ = \beta_f F + \beta_z Z + \beta_A A + \varepsilon \quad (5a)$$

The household leases-out land ($D < 0$)

$$D^- = \beta_f F + \beta_z Z + \beta_A A + \varepsilon \quad (5b)$$

where ε is the error term.

Using the formulations in 5a and 5b, we test several hypotheses in the literature on which factors affect the participation in land rental markets in Kenya. In an environment in which factor markets are incomplete there are a number of factors that influence households' decisions in land rentals. From the demand side of land rentals we have

land scarce households, but endowed with complementary inputs such as labour, fertilizers and so forth. We would expect that the element β_f corresponding to the amount of land owned to be positive in the rent-out and negative in the rent-in equations respectively. An important factor is the household demography which includes age and gender composition, size and access to credit. These factors influence the decision to rent in land. We tackle each of the factors in the following sections beginning with land endowment.

- The land endowment of the household will affect the decision to rent. With some inputs fixed, and market imperfections which constrain extending some inputs, the marginal productivity of the land will decrease with land use. If the marginal productivity of the land at the level owned by the household is still larger than marginal costs of renting in additional land then the household will rent in more land. The more land the household owns, the less likely, it is to rent in and the more likely to rent out. However, this may be overcome or even reversed if the land endowment relaxes the household's credit constraint.
- The household labour supply will affect the land rental decision. With supervision costs making hired labour more expensive than household labour, the household labour supply will positively affect the decision to rent in land.
- Higher wages, either for the off-farm employment or for hiring farm labour or both reduces renting in of land and increases renting out of land as employing labour on the farm becomes more expensive either in terms of wages or the opportunity cost of labour.

IV. The Study Area, Data and Survey Description

To gain insight into the working of land rental market in Kenya we use data collected from Laikipia district. Laikipia is one of the districts in the Rift Valley that borders Samburu to the North, Isiolo to the Northeastern, Meru Central to the South, Nyandarua and Nakuru to the Southwest, and Koibatek and Baringo to the West. It covers an area of 9,693 km² and lies between altitude 0° 18" and 0° 51" North and between longitude 36° 11" and 37° 24" East.

The district has diverse topographical features, climatic conditions and cultural settings. The district is subdivided into 7 divisions, namely: Central (2,392 km²), Lamuria (1,261 km²), Mukogodo (1,103 km²), Rumuruti (2,786 km²), Nyahururu (167 km²), Ol Moran (1,227 km²) and Ng'arua (757 km²). The arable land in the district is 1,984 km² while the non-arable is 7,107 km². The altitude of the district varies between 1,000m above the sea level at Kipsing plains and 2,600m around Marmanet forest. The district consists mainly of a plateau bounded by the Great Rift Valley to the West, and by the Aberdare ranges and Mount Kenya to the south.

Agriculture is the main activity in the district and contributes 75% of household income in Laikipia. Nearly 79% of farmers in Laikipia practice food crop farming, suggesting that subsistence farming is the dominant activity. Most of the agriculture is practiced in Ng'arua, Rumuruti, Central, Nyahururu and Lamuria divisions which are also classified as high and medium potential lands while Mukogodo and Ol Moran are considered too dry. In particular in Lamuria and Central divisions horticultural farming is practiced along riparian land. Cut flowers, French beans are grown for the export market. In Laikipia, 108,853 people work in crop sub-sector, compared with 27,462 people with main activity as livestock tending.

Emerging informal land rental markets in Laikipia: a review

Laikipia district was designated as “White highlands” and had large scale farms and ranches, group or individually owned lands. Land buying cooperatives were formed to buy these large scale farms left behind by departing British settlers. To date a number of cooperatives and land buying companies still operate in the district. Cooperatives and land buying companies have since subdivided the farms and settled members on the plots. Consequently, there is continuous immigration into the district by the new settlers. Recently, there has been a steady influx of legal immigrants into the district². These legal immigrants have come to the district through land buying companies, (Republic of Kenya 2002). To compound the problem there has been an increase in the number of illegal squatters on public land. Through land buying companies the range lands in the district have been subdivided into uneconomical units of 2-5 acres. These small scale holders cannot even feed themselves as the land productivity has been

² Population density is increasing as a result of immigration that has characterized the district ever since 1963 and is set to reach 47 persons per km².

considerably lowered. The government response has been to halt new land allocations and a directive to the District Land Control Board not to give consent for such sub divisions.

Faced with these circumstances and to meet consumption needs, many have resorted to land rentals to increase their land holdings. There is no official data about the current importance of land transactions in Laikipia as most of the contracts are informal. Due to the absence of updated land information and data there are several incidences of double allocation and forgeries on land documents. Many resort to family and social connections to search for rental land without encumbrances. Agricultural based societies are involved in the marketing of agricultural produce³ and supply of inputs. Some of the land cooperatives or companies have not subdivided their land to members. They largely lease these lands to their members or to people from outside the district. An important feature of the land rental market is that rental agreements are temporary and thus provide little incentive for efficient farm investments. Due the nascent nature there is no minimum length of rental contract of several years in order to allow tenants sufficient security of land operation.

Data collection

The data were collected as part of the International Food Policy Research Institute (IFPRI) Eastern Africa Food Policy Network Studies (Obunde 2004)⁴. A total of 320 households were sampled for interviews. The quantitative data were collected using a detailed pre-tested questionnaire. A combination of direct observation and informal interviews were also subsequently conducted to fill any gaps left by the survey and to rigorously verify the information collected. The survey was undertaken in the following divisions; Central, Lumuria, Ng'arua and Rumuruti. These were randomly selected from a cluster of 10 sub-locations. Each of the clusters had almost similar agro-ecological conditions. Stratification was undertaken to ensure that various types of tenure security were captured in the final sample.

Within each sub-location, eight clusters were formed out of which four were randomly selected. This clustering ensured that every part of the sub-location was

³ The main cooperatives are involved with marketing pyrethrum, milk, cereals and coffee.

⁴ This was complemented by a survey by the author in March, 2007 which followed the baseline households to verify some of the facts and figures.

given an equal chance of being included in the sample. In each of the selected clusters, a list of the household heads was compiled. A total of 40 respondents were then randomly selected from the aggregate list of farm families in each sub-location.

In this study, the unit of observation was defined as any family unit that had a parcel of land to cultivate. In polygamous families, the term 'household' was construed to mean a family of each of the wives that had been allocated parcels of land by the husband. This is in line with the customary tenure system where each of the wives is normally allocated parcels of land by the husband to cultivate. The same applied to sons who had been allocated parcels by their fathers to cultivate even though they still resided in their father's homestead.

The household surveys included conventional modules on household demographics, land holdings and participation in land markets in the year 2002. The land history module asked households to reconstruct the evolution of their stock of owned land and their participation in rental transactions. These data allowed the calculation of each household's land portfolio for the year. These data allow us to see how effectively the land market operated in the district. Some basic characteristics of the sample households are presented in Table 1.

Table 1: Household characteristics by rental activity

	Units	RENT IN	RENT OUT	NOT	ALL
No. OF HOUSEHOLDS	Number	102	86	132	320
SHARE OF TOTAL	Percent	31.8	26.8	41.2	100
AGE OF HOUSEHOLD HEAD	Years	48,89	55,94	53,49	52
HEAD'S EDUCATION	Years	8,1	7,4	7,6	7.7
MEAN LEVEL OF EDUCATION	Years	7,5	6,48	6,52	6,87
LIVESTOCK VALUE	K-Shillings	11120	24280	36980	34000
HOUSEHOLD SIZE	Number	6,7	5,6	6,6	6,8
NO. OF PERSONS <=15	Number	1,7	1,5	1,3	1,4
NO. OF PERSONS 15-55	Number	2,5	2,7	2,4	2,4
NO. OF PERSONS >56	Number	0,6	0,6	0,8	0,8
<i>Land endowment variables</i>					
LAND OWNED	Acres	0.01	8.3	3.48	5.2
LAND CULTIVATED	Acres	3.7	4.9	3.77	3.5
LAND BOUGHT (1990-1999)	Acres	0	2.7	2.1	2.5
<i>Transaction costs variables</i>					
COOP MEMBERSHIP	Percent	12	23	35	30
PARTNER	Percent	3	18.90	28.30	18.30
<i>Regional variables</i>					
DISTANCE TO NEAREST ROAD	Kilometres	7.42	6.48	5.62	6.46
CENTRAL(Reference)	Percent	32.6	19.1	49.3	31.0
LUMURIA	Percent	26.3	20.1	53.6	20.0
NG'ARAU	Percent	20.3	17.5	62.2	24.0
RUMURUTI	Percent	11.3	3.1	85.3	15.0

The descriptive statistics show that 32% rented in land, 27% rented out part of their land while 41% did not participate at all. The mean age of household heads is 52 years with a low level of educational attainment (8 years). Though not very different from others, the mean age is lowest among those renting in land. Household heads participating in renting out land are probably retired. Non participant households are aged about 53 years with 7 years of education. The household heads leasing in land are slightly younger and have relatively more education. Livestock endowment varies within the sample, with the largest value among those that do not participate in rental activities. It is not surprising to find differences in livestock value of those that rent-in land. Plausibly they do not have a place to keep them or may still be in the process of accumulation.

Households engaged in renting out land had on average 6 members. Those renting out and not participating had on average a family size of about 7 members. Turning to household composition, households that rent in land had on average 2

members aged below 15. On average those not participating land market activities had on average a family member below 15. In terms of labour endowment, those aged between 15 and 15 years, there are no differences between households renting in and those renting out. For those aged over 56, there is no difference across the land market activities.

Before discussing land variables owned and cultivated, we note a number of issues. First, land measurement is done with error due to absence of direct physical measures. Most households have a well defined notion of an acre of land but the fields are irregularly shaped and none of them had taken direct measurement of the land. It is highly probable that all land variables suffer measurement error. The land variables used in the model attempt to capture tenure insecurity. Consider a household that wants to acquire more land for farming. Second, buying land (compared to renting) ensures that a household can capture benefits of investment as well as sufficient land in future. It could also act as a hedge against inflation and bring in social status too. On the other hand renting requires less liquidity and will ensure additional land is available to the household. In these circumstances it is possible that households will combine both owned and rented in land. Land owned by the household is the amount of land holding at the time of the survey. This variable can be expected to be negatively related with the amount of land rented out.

There are important differences between households which rent in land and those who rent out or do not participate in the rental market. Land owned is the amount of land owned by the household when the survey was implemented. On average households leasing-in land owned less land (0.01 acres) than households non participating (3.5 acres) and households leasing out (8.3 acres). Those not participating in land rentals hold about half the land holding of those that rent out. In terms of land cultivated, those renting in end up cultivating about 4 acres of land which is comparable to those not participating in rental activity. Rental market appears to equalize cultivated which confirms the adjustment mechanism by households to their factor endowments that are imperfectly tradable. Some households purchased land during previous years. Households engaged in renting in land did not purchase land between 1990 and 1999 which may be confirming the migration into the area as explained before. Households involved in renting out land had on average purchased about 3 acres of land as

compared to those not participating that had bought about 2 acres. When land is rented in, set up costs may be incurred before it is engaged in production. For instance informal discussions revealed that newly acquired land is rented out to new immigrants to open it up by removal of stumps and fencing for subsequent use.

As alluded to earlier, households were members of land buying cooperatives or partners in farming companies. These were formed largely to purchase the large ranches and farms left behind by departing settlers. A substantial share (35%) of households not participating in land rentals were members of a cooperative society, compared to (23%) that were involved in renting out and (12%) of those renting in land. A small proportion (3%) of those renting in were partners in farming companies in comparison to 19% of those involved in renting out and 28% of those not participating. One becomes a partner by buying shares in these land buying companies. The small number by those renting in may be a reflection of the low wealth status of recent settlers.

These variables capture transaction costs in the land rental market. Transaction costs in the land market arise because of search costs for rental land, negotiating the terms and inquiring about rental prices. Cooperative farms, are the historical users of the land, in Laikipia District. Membership in cooperative reflects the extent of domination of the land market by farmer cooperative societies. Individual farmers have to pay a premium in rental payments to access the land used by cooperative farms. Thus households face important transaction costs in accessing land in locations dominated by land buying companies.

The other transaction costs indicator is partnership in land buying company which is a dummy variable, which equal one if a member of the household is a member a or a partner in a land buying company, respectively. The relationship is expected to reduce transaction costs in renting land out on the cooperative farms. They may also reduce transaction costs in accessing other inputs and sales markets for household farms, or create spillovers in terms of better management, information, or technology, and therefore enhance the profitability of land use on the household farm. Both variables are therefore expected to have a positive impact on renting out of land and on renting in.

Finally, four regional variables are included to capture fixed effects. The reference category is Central division which includes the district headquarters in Nyahururu. We also include distance to the nearest road which has relevance of access to market information and transport. Households participating in land renting in cover the longest distance to the road (7km) in comparison to the shortest (6 km) by those not participating. Plausibly these results document a settlement pattern in which accessible areas are settled first followed by more remote ones later.

V. Estimation Results

Results of estimating equations (5a) and (5b) are illustrated in Tables 2 and 3. For each sample, we estimated a classical single censored tobit regression. This regression model captures both the limit (zero) and non-limit continuous observations. In line with the conceptual discussion we are interested in the effect of transaction costs on land rental activities. The “rent-in” estimation used the sub sample with zero or positive values for the amount of land rented in. The “rent-out” estimation used a sub sample with positive values for the amount of land rented out. Estimating single tobit models on the two sub-samples was preferred over pooling the data and estimating one least squares model, because the first procedure allows intercept and slope coefficients to be different for the two sub-samples (see Skoufias, 1995, for an in depth discussion).

Table 2: Parameter Estimates for Tobit with Amount of Land Rented- IN

	A	B
<i>Human Capital</i>		
Age of Head	0.212 (2.94) ***	0.414(2.15)**
Age of Head Squared	-0.035 (2.68) ***	-0.030(2.57)**
Education of Head	-0.312 (1.94) *	-0.345 (2.62)***
Education of Head Squared	0.179 (2.52) **	0.154 (2.34)**
Household Size	0.195 (2.75)***	0.162 (2.78) ***
Nr. Active Adults (15-55)	1.015 (2.25)**	0.956 (2.31)**
Amount of Land Owned	-0.243 (3.02) ***	
Land Cultivated		0.562(3.27) ***
Land Cultivated Squared		-0.025(2.59)**
Land Purchased		-0.341(1.36)
Land Purchased Squared		0.002(1.21)
Livestock Value	-0.002(0.512)	-0.005(0.602)
<i>Regional Effects</i>		
Member Cooperative	0.954(0.356)	0.773(0.545)
Partner Land Buying	1.563 (2.456) **	1.725(2.71)***
Distance to Road	-0.089 (1.89) *	-0.029(1.86)*
Lumuria	2.152 (2.25) **	1.813(2.57)**
Ng'arau	-2.123 (1.112)	-2.158(1.15)
Rumuruti	0.604 (2.106) *	0.243(2.45)**
Constant	-4.345 (6.065) ***	-6.410(3.13)***
Nr. of Observations	102	102

Absolute value of t statistics in parenthesis

*significant at the 10% level

** significant at the 5% level

*** significant at the 1% level

Results for the estimation of the rent in model are presented in Table2. We tested for various specifications by excluding some variables which were suspected to be either collinear or endogenous. Renting in of land is affected by the age of the household head. As expected age has a non-linear impact on renting in of land. The negative coefficient on *Age of Head Squared* indicates that the land area leased increases first with age then decreases. More years of schooling by the household head reduce the propensity to rent in land. Rental markets provide land access to young and with relatively few years of schooling. Large households are likely to rent in land while higher amounts of family labour are less likely to do so. Having more family workers in a household (Adult workers 15-55) increases the area of land leased in.

There is one potentially serious problem with the Tobit results from the above regressions and that is the problem of missing data. Some households declined to answer one or more of the questions with regard to land. The main questions where missing data is a problem are those related to amount of land rented in/rented out. When

household heads were asked if it is generally the case that they rented in/ rented out land, 102 out of 320 answered yes and 86 responded to renting out with 218 and 234 respectively declining to answer. Thus when asked a straightforward question of yes or no regarding land rentals, declining to answer is not much of a problem, however when asked about the size of the plot, the response is rather different. Only 188 correspond to those that answered the second part of the question regarding the amount of land either rented in or out. Missing data on this scale may call into question the Tobit results. To reaffirm confidence of our results in light of the missing observations we used the Probit for the first stage of whether or not household participates in the land rental market. We tested whether the missing dependent variable had a significant impact by focusing on the part of data regarding whether or not a household participated in the land rental market which had no problem. A Probit regression using the binary dependent variable whether one rented-in/ rented out will have few missing observations if any. The question then is one of comparing original Tobit regressions with these Probit results. Mathematically, Tobit coefficients are constrained to be proportional to coefficients from a Probit regression that regresses a binary form of the dependent variable on the same independent variables, Johnston and Dinardo (1997) for more on the relationship between Tobit and Probit. In our case the constant of proportionality is the ancillary parameter (the standard error) of the Tobit regression.

Thus our test of the impact of missing dependent variable observations was to compare “probit coefficients obtained from transforming our original Tobit coefficients to actual probit coefficients drawn from a probit regression where the dependent variable was based on yes/no question on land rent-in/ land rent-out. The transformed probit coefficients were obtained by dividing the original Tobit coefficients by the standard error of the Tobit regression. This is the comparison referred to in the text and based on those results the Probit coefficients, z- statistics, and marginal effects obtained from our Tobit regressions and from a Probit using the binary response data where missing data is not a concern. Overall the signs and magnitudes are similar and this provided support for results.

In model B the sign on the *Land Purchased* coefficient conforms to our expectation, although not significant. Purchase of land in the past may imply adjustments in land holdings which alter the size of land held by the household. Such

holdings may also act as a substitute to more land adjustments and reduce households' propensity of participating in the land market. To avoid potential multi collinearity problems we first estimated the model with *Land Owned*. In the second model we have excluded *Land Owned* but included other land variables. We also tested for collinearity of these independent variables by using the testing procedure proposed by Belsley, Kuh, and Welsch (1980) to test whether there exists a linear relationship among the land variables that may lead to unreliable regression estimates. Following this procedure, the condition number of the independent variables indicates that there are no collinearity problems with the estimated regressions.

The coefficients of *Land Ownership* confirm the hypothesis that households owning more land are less likely to rent in land. The insignificant coefficient on Land Purchased indicates that land purchases were not a mode of increasing or getting additional land. The *land cultivated* of the household has an important impact on land renting in. The estimated coefficients on the land cultivated variables are all significant and indicate an important relationship to renting in. The impact of the land variables is mostly non-linear, with significant coefficient estimates for several of the squared terms of the variables. The income from cropping activities perhaps contributes to improving the household's income status which in turn is used to pay for land rental.

There is potential for endogeneity between *Land Endowment* and *Land Owned* and thereby provide inconsistent estimates. In model B we drop *Land Owned* but our results remain robust to the alternative specification. More importantly they confirm the hypothesis that initial land endowment of the household is negatively correlated with renting –in of land.

The estimated results are consistent with our hypothesis on the importance of transaction costs. A member of the household being in *Partnership* in a land buying company has a significant positive impact. Partners in farming companies are more likely to rent in land, which may result from reduced transaction costs in accessing other inputs and sales markets or from spillovers in terms of management, information, or technology and therefore enhanced profitability of land use on the household farm. With regard to the renting in of land, it appears that members of cooperatives do not get benefits in the form of reduced transaction costs or lower constraints to induce them to rent more land.

Distance away from major road reduces the likelihood of renting in land. As distance to road increases, the opportunity cost of farming appears to be falling thus farmers are less likely to rent in land. Some of the *regional* variables have important effects. We find significant effect on renting in of land being in Lumuria and Rumuruti relative to Central division. Renting in is considerably higher in these divisions due to the proximity to Nyahururu town where high incomes are concentrated.

Estimation results for the renting out of land are reported in Table 3. The results in column A are the core, which are complemented by those in B that leave out some potentially correlated and endogenous variables. In general human capital variables do not affect the area rented out except the age of the household's head. The age of the household head has a positive and weakly significant effect on renting out land. The negative coefficient on the square of age indicates that land area rented out increases first with age then declines. Younger heads of households may have an off-farm activity that prevents them from farming all their land endowment but once retired; they have more time to farm the entire land. The effect of education on the renting out land is weak though positive. This result may reflect the view that farming by these households is toward self consumption. Agricultural production at this level is practiced on small areas and does not require managerial abilities.

Increasing the number of dependants (children below 15 years) increases the area of renting out land holding complimentary variables such livestock value and number of adults constant. However, when the effect of household composition (Adults between 15 and 55) is considered, it decreases the area of land rent out. Thus increasing the number of adults in a household decreases the area of land rent out. A plausible explanation is that health adults provide labour which is compounded by pressure for subsistence needs.

The sign on the coefficient *Land owned* is positive and significant which indicates that large land holdings increase the likelihood of renting out land holding other factors constant.

The value of livestock owned by the household has a negative and strong effect on the renting out of land. Holding land size constant, increasing livestock reduces the incentive to rent out land. An increase in available livestock reduces the

need to rent out land. As value of livestock owned increases, farmers are more willing to work on their farms.

Table 3: Parameter Estimates for Tobit with Amount of Land Rented- OUT

<i>Human Capital</i>	A	B
Age of Head	0.035(1.82)*	0.032(1.86)*
Age of Head Squared	-0.002(1.165)	-0.003(1.151)
Education of Head	0.170(0.324)	0.209(0.398)
Education of Head Squared		-0.011(0.314)
Nr. of Children <15	0.012(1.702)*	0.067(2.024)**
Nr. Active Adults (15-55)	-0.248(3.16)***	-0.184(2.14)**
Amount of Land Owned	0.057(2.87)**	0.054(2.88)**
Land Cultivated		0.208(1.78)
Land Cultivated Squared		-0.001(0.852)
Land Purchased	0.009(0.46)	0.007(0.98)
Land with title (dummy)	0.528(2.35)**	0.953(3.23)***
Livestock Value	-2.312(3.35)***	-2.122(3.36)***
<i>Regional Effects</i>		
Member Cooperative	1.567(2.719)***	1.524(2.803)**
Partner Land Buying	0.079(0.971)	0.082(0.912)
Distance to Road	-0.247(0.214)	-0.223(0.201)
Lumuria	-0.356(0.641)	0.353(0.568)
Ng'arau	2.26(2.657)***	2.361(2.080)**
Rumuruti	-0.154(0.228)	-0.147(0.124)
Constant	-4.434(5.22)**	-5.284(3.917)***
Nr. of Observations	86	86

Absolute value of t statistics in parenthesis

*significant at the 10% level

** significant at the 5% level

*** significant at the 1% level

Possession of a land title has a positive and significant effect on renting out land. One argument is that property rights remain quite insecure in the eyes of land holders without the title and hence reluctance to rent out. Households with larger land parcels are more likely to rent out land. The value of livestock owned by a household is a positive and significant determinant for renting out land. Households living in Nga'rua where large scale farms are present are more likely to rent out land. This may confirm difficulties faced by landowners in finding tenants in areas where cooperatives are few.

Next we address the symmetry of adjustment when land is rented- in or out. If transaction costs affecting the renting out of land affect in a similar manner the renting in of land, we would expect equality of coefficients in both sign and magnitude. Recall that *Land Owned* by households negatively affects the land area rented in and

positively affects the land area rented out. We conducted a Wald test, in which the hypothesis of parameter equality cannot be rejected. These results confirm the role of reallocation of land played by rental markets.

Finally, we test for the presence of transaction costs on the land rental market. We test the joint hypothesis of the *Land Owned* parameters equality to -1 ($\beta_{\text{rent in}} = \beta_{\text{rent out}} = -1$). This hypothesis is significantly rejected on both markets, which implies that adjustment realised by the land rental market remains imperfect.

VI. Conclusions and policy implications

It is widely accepted that improved access to farmland by the rural poor may contribute to agricultural productivity and poverty reduction. Many poor rural households are still unable to gain sufficient access to land, due to market imperfections and policy distortions. This paper sought to examine the determinants of participation on rural land rental markets as a mechanism to improve access to land.

Our results are pertinent to the current debate on Kenya's land policy. We tested the effects of human capital, transaction costs, and other market imperfections on land rental markets in Kenya. Households' management ability and land endowment, transaction costs in the land market were identified as important factors affecting land rental activities of rural households in Kenya.

A key general finding from our empirical analysis-with important policy implications, is that imperfections in other markets may have significant effects on rural land markets, including on rural rental markets. Using data from a representative survey of Kenyan household farms, our empirical estimations provide empirical support for a number of these hypotheses. More specifically, we draw the following conclusions.

First, we find that land rental markets allow households with higher farm management capacities to access more land. Better education of the household head is positively correlated with renting in of land. When households grow older they rent out more. As such rental markets play an important efficiency-enhancing role by reallocating land between households with different needs and capacities in managing farms.

Second, our findings show that where the land reform is largely implemented and land titles distributed, important transaction costs remain and still hinder efficient land rental transactions. In some regions of Kenya where large cooperative farms use the vast majority of land, the efficiency of the land market and positive equity effects are constrained by imperfect competition and unequal access to information and uneven enforcement of land rights and exchange. In addition, households with connections to cooperative organizations, for example, because household members are partners or members in land buying companies, have better access to the land rental market.

Third, households use the rental market to rent out land if their initial land endowment is large compared to their optimal farm size. There is no effect of initial ownership of land on rental activities, suggesting that rental markets do not lead to a concentration of land at the household level, while allowing more efficient land use. As land ownership often is very fragmented, rental markets allow a consolidation of land use by both large scale farming organizations and rural households.

More generally, these findings imply that rental markets can have important positive equity and efficiency effects in Kenya, despite existing imperfections. Land-poor households access land through the land rental market, and are therefore more likely to be able to access land through renting in than through sales markets, a conclusion consistent with findings from other developing countries (Swinnen and Vranken, 2005). At the same time, older households use rental markets to get additional household incomes. In addition, we find that such land was more likely to be rented in by households with better human capital, leading to efficiency gains. Hence, these findings imply that land rental markets are playing an important role in reallocating land to those with better capability to farm, that is, households with relatively better farm management capacities, and in increasing efficient land allocation through consolidation of land use.

The findings for Kenya have broader relevance. First, in several neighbouring countries, such as Tanzania, Uganda etc., large farms exist and continue to play an important role in the land market. The domination of these large farms and the associated differences in land access between them and household farms is an important issue for both equity and efficiency reasons. There are valid economic arguments why

large farms may be more efficient in some sectors and under some conditions, and in countries with few people left in agriculture and with a highly fragmented land ownership structure, large farming corporations reduce problems of land fragmentation. However, there is also considerable evidence that large farms have used institutional and political advantages to consolidate their position in the land market to the detriment of more efficient farm structures in other countries (see Swinnen and Vranken, 2005). The implications are not only important for efficiency, but also for equity reasons, as the dominance of these organizations in the land market may impede upon the land property rights of households, the owners of agricultural land. Our empirical findings support this argument.

Second, the importance of land rental markets in exciting beneficial equity and efficiency effects for household farms, and its ability to contribute to reduction of farm fragmentation, is relevant for all transition countries as household farming has grown strongly everywhere. In many developing countries, household farms now use more than half of all land.

An important policy issue in this respect is that much of the policy focus, often under pressure from donors such the World Bank, has been on the encouragement of land sales markets, while land rental markets are more likely to play an important, and positive, role in the present. Hence, rental markets should not be considered a side issue in the discussion of land markets, but instead should be the focal point of attention.

Our findings confirm that in a country like Kenya, where land sales markets have been slow-land rental markets may play a bigger role even when the importance of land sales transactions declines. Hence, renting of land should not be seen as temporary institution that will disappear. Therefore, it is important to focus policy attention on a set of issues which need to be addressed in order to allow the rental markets to contribute to further efficiency improvements and poverty reduction in rural areas. These attention areas include land-specific issues such as imperfect competition in the land market and transaction costs impeding access of households to land. However, as we demonstrated in this study demonstrates that in rural markets, in particular markets for rural credit, labour, and farm products, may have important

effects on land rental markets and should therefore receive appropriate policy attention in this perspective.

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