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Determinants of Land Contracts and Efficiency in Ethiopia: The Case of Libokemkem District of Amhara Region

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Abstract

The land policy reform that took place in the 1990s in northern Ethiopia has resulted in various forms of land contracts and efficiency. As a policy measure, sale of land is officially prohibited while leasing and inheritance are allowed in one form or another. This paper attempts to assess the efficiency of the different forms of tenure arrangements emerging in Libokemkem district of the Amhara region, northern Ethiopia, and their implication for land tenure policies.

With the help of maximum likelihood estimates the effect of various factors on total operated fields was examined. The maximum likelihood result indicates that oxen ownership; family size, age, and total income determine the total cultivated land. It was also shown that choice of crops (tef and wheat) resulted in positive estimates indicating that crop types determine the land area operated. Choice of tenure arrangement on the other hand depends on livestock units, large family size and food shortages, and access to markets. This finding calls for a kind of intervention, which can support operation of informal land markets to be more efficient than the prevailing situation.

Keywords: land contracts, efficiency, land tenure policies, Ethiopia, Libokemkem

1 Introduction

There are different arguments regarding sharecropping and land tenure arrangements in productivity and efficiency. The efficiency of land lease market is a critical issue in many developing countries including Ethiopia. Land markets are obviously thin and inhibited by problems of asymmetric information and limited development of credit markets. The issue will be more important in Ethiopia, under a situation where land sales are officially prohibited but leasing and inheritance are allowed in one form or another. The government of Ethiopia has taken measures in land reform; however, the land still remains as a public property. The policy measures taken after 1991 have

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regional dimension and further implication on equity. Autonomous rights were given to regional administrations for internal land administration and policy implementation.

In Amhara National Regional State, the redistribution of land has taken place in 1997, deepening the reform process as an equity measure between males and females. Consequently, many women households have had access to land irrespective of size and quality. It is believed that the measures would show positive impacts on productivity and in poverty alleviation. Although land lease and inheritance are allowed, restrictions are imposed on the mechanisms of how these work.

However, there still appears to be land scarcity, due to population growth and declining productivity. Consequently people switch to different forms of land acquiring mechanisms. Leasing or renting of land, sharecropping, inheritance of land are some of the common forms of land arrangement currently operating in the area. It is against this background that this paper attempts to assess the efficiency of the different forms of tenure arrangements emerging in Ethiopia, particularly in the Amhara region and their implication for land tenure policies.

1.1 Empirical evidences and theoretical consideration

Anecdotal empirical studies have indicated mixed impacts of forms of land tenure arrangement on productivity. JOHNSON (1950) and CHEUNG (1969) argued that if the tenants' work effort can be monitored without cost and enforced by the land lord, then resource allocation can be as efficient under sharecropping as under owner cultivation or fixed-rent tenancy. The majority of studies do not find significant inefficiency of share tenancy (OTSUKA and HAYAMI, 1988). The available literature on the effect of alternative land tenure contract is dominated by studies conducted in South and south east Asia, with little information from sub-Saharan Africa. Hence we do have very scanty information in sub-Saharan Africa particularly, in Ethiopia.

Although there is a kind of informal land market, no study has been conducted to verify the impact of the market on productivity. The informal land market or transaction in the study area has more of gender dimension. Although females have in principle equal rights to share land with males during redistribution of land, which took place in 1997 in Amhara region, however, most women are oxen-less, and have little or no capital compared with their male counterparts. This process has resulted in the informal transaction of land. Female farmers with abundant farmland often rent out or lease out their land for male farmers. Few male farmers also rent out their land for lack of sufficient working capital. The lease-out and lease-in or rent-in and rent-out of land takes different forms. It may take place on verbal agreement in some cases and in some other cases with written agreement.

The traditional institutions play an important role in this regard to fulfil the function of land transaction. In such case, for ease of analysis we classify the forms of tenure arrangement into those owned [PA (peasant association) allocated] and operated and those non-PA allocated (land importers) in the form of rent-in and sharecropped farm-

land. This study makes use of the data collected at household level and their plots in order to verify the impacts.

2 Methodology

2.1 Choice of the study area and its some characteristics

The study, which was conducted in June 2000/01 was part of a survey work aimed at formulating a food security enhancement project (Winrock International Ethiopia, 2000). General information about the study area and its charactristic features are given in another report (Mamo and Ayele, 2003). Reconnaissance type of survey was conducted to rapidly investigate and visualize the resource endowments and institutional set up of the area under investigation. After examining the initial data set including the secondary data sources, survey was conducted on sampled households. Equidistant strata of households were constituted from which households were selected from sex and age proportions within the households. Inter and intra household composition was considered in setting the sample size. The proportion (N_i) of households selected taking into consideration each *Limat tabia* (development center), depend on the number of male and female-headed households (n_i) and standard deviation of major variables. In this regard a total of 150 farmers (94 male and 56) were selected from the peasant association for a detailed survey. The data collection procedure involved selecting and training enumerators and sample farmers. Some response and measurement errors were difficult to detect and correct, although efforts were made to minimize errors.

Farmers in study areas are mainly subsistence practicing mixed crop livestock system. Tef (*Eragrostis tef*) and wheat are the dominant crops. The villages are located in the high potential cereal producing areas with little access to markets. Consequently the use of purchased inputs such as fertilizer and improved seeds are less in the study area than in many parts of Ethiopia.

The average family size is close to 5 households. The variability is however, very high within the households. The average farm size also differs between female and male-headed households. The mean holdings in female-headed households are 0.809 ha as against 1.02 ha in male-headed households. Farm area can actually be classified as cultivated area (allocated for various crops), grazing area, forest, and unused area. The allocation of farmland to various crops depends upon the priority of crops in the household. Continuous subdivision and redistribution of the available land resulted in excessive fragmentation of landholdings and a decrease in the size of land. Some evidence in the study area indicates that land fragmentation has increased and is greater than the previous time (since 1992). On the other hand, landlessness has decreased because of land redistribution. The decrease in average land size holding, on the other hand, might be due to distribution and redistribution of land, which took place in the region; this resulted in various forms of tenure arrangement to acquire extra land, which is the subject to be discussed in this paper.

2.2 Method of data analysis

Econometric method has been employed to model the effect of land use, lease contract choice, use of labour, oxen and output. We have collected data on two major dependent variables cropland area operated, and choice of land contract forms (sharecropping + rent land), which could be affected by many factors. If transaction costs are to be monitored the role of each factors would be different. However, due to lack of sufficient database and the informal land marketing role of traditional institutions, we did not tend to evaluate the influence of transaction costs on efficiency.

The econometric model here specified with the use two ways of modelling:

1. Maximum likelihood estimation, assuming that u_i is independently and identically normally distributed across households and censored estimation. The model is employed here to estimate the effect of various factors on total operated fields for cereal production. Here the assumption is, the area operated includes the total cultivated land for crop production including those plots imported or transferred from other sources, i.e. sharecropping + rent-in land.
2. Multinomial probit model, employed to address the effect of the same variables as used in (1) on household imported/transferred plots. A fairly comprehensive choice of households for the land operated was modelled and estimated as one system of interrelated decisions (PENDER and FAFCHAMPS, 2001).

The two models were provided as follows:

$$Cropland = \beta_{cr} Z_i + \mu_i \tag{1}$$

$$Contrchoic = \alpha LY + \sigma_i \tag{2}$$

Where β_{cr} is the coefficient estimated, Z_i is a vector of observed variables affecting desired area operated and u_i is the unobserved error term in (1).
Choice of contract land (sharecropped + rent-in) as in equation (2) depends on other factors provided by vector Y and estimated coefficient of α which also includes the exogenous variable of CROPLAND variable as independent variable. The choice variable indicated was between own land which is acquired through land distribution process from peasant association (PA) and that of the transferred or imported land (sharecropped + rent-in). The variables hypothesised to have effect on both cropland and choices of land contract are indicated in Table 1.

3 Results of the Study

According to the theory, area cultivated may be affected by the household's endowments of land, labour, capital, and other assets determining household income. The household's physical endowments are represented in the regression specification by the logarithms of land owned, household labour supply, value of fertilizer, and livestock owned. The physical endowments are represented in the regression specification, by the logarithms of land owned, logarithms of oxen number, logarithms of livestock owned and wheat area. Human capital endowments (potentially affecting farm productivity) were represented by age and level of education of the household head.

Table 1: Description of the explanatory independent variables Variable descriptions

Variable descriptions	*Variables*
Level of education in years	EDUCATIO
$\ln(family\ size)$	LNFAMSIZ
$\ln(land\ owned)$ in hectare	LNOWN
$\ln(plots\ acquired\ through\ transfer\ rent\ in\ sharecropping)$	LNPLOTS
$\ln(oxen\ owned)$	LNOXEN
$\ln(livestock\ owned)$	LNTLU
$\ln(age\ in\ years)$	LNAGE
DAP fertilizer used	TOTALDAP
Urea fertilizer used	TOTALURE
Distance from main market centre in minute	DISTANCE
Food shortage (Dummy = 1 if yes, =0 otherwise)	FOODSHOR
Total agriculture income earned	INCOMTOT
Total tef production in kg	TEFPRODU
Total wheat production in kg	WHTPROD
Hired labour in number	HIRELABR

The censored regression results are presented in Table 2. The maximum likelihood estimates support the effect of oxen ownership, family size, age, and total income earned from cultivated land and distance from main market centres on cropping land as shown in Table 2. Family sizes and oxen ownership have indicated a positive and yet a significant association with the ownership of land. The effect of livestock ownership, though has shown a positive coefficient, is no longer significant due to large standard error in the model. The model result further indicated that *tef* and wheat yield have resulted in positive close association in the maximum likelihood estimates, supporting the hypothesis that production of the two crops depends on land area operated.

Interestingly enough, higher oxen ownership significantly increases area operated in the model. It is also equally true that household endowments such as owned plots acquired through PAs, plots rented and sharecropped have a positive impact on land cultivated although not that strongly significant. Household family size and age of the farmer have also contributed positively and significantly to the effect on land cultivated and operated. More land was brought into cultivation as family size increases and age increases. Whether or not types of access to land were affected by various factors was modelled using a multinomial probit model. It is hypothesised that land tenure arrangement is a construct of specific tenancy contracts or tenure arrangements in a specific farming system (Pender and Fafchamps, 2001). In that case certain variables

Table 2: Determinants of ln (cultivated land under cereal) - Censored Regression

Variables	*Coeff.*	*Std.Err.*	*t-ratio*	*P-value*
EDUCATIO	0.0829	0.048	1.70818	0.0876***
LNFAMSIZ	0.203	0.055	3.6874	0.0002*
LNOWN	0.219	0.062	3.3846	0.000*
LNPLOTS	0.083	0.050791	1.6372	0.1015
LNOXEN	0.0003	0.0002	2.7568	0.0058**
LNTLU	0.006	0.0001	0.4832	0.6289
LNAGE	0.1674	0.03314	4.96865	.006*
TOTALDAP	0.002	0.00010	0.19783	0.843
TOTALURE	0.0002	0.00013	1.93899	0.052***
DISTANCE	-0.0003	0.00008	-4.17385	0.0002**
FOODSHOR (Dummy =1 if yes, =0 otherwise)	-0.06351	0.052501	-1.20983	0.226
INCOMTOT	-0.0006	0.00003	-2.26476	0.0235**
TEFPRODU	0.0003	0.0006	6.73789	0.0001*
WHTPRODU	0.00023	0.00002	7.83858	0.0000*
HIRELABR	-0.06221	0.0617986	-1.00667	0.31409
Sigma	0.26357	0.0161063	16.3648	0.000002

* , ** and *** are significant at 1%, 5% and 10% of significant level

were hypothesised to confirm to the expected sign of the model results. We used the same variables for explanatory variables as in the censored regression model in Table 2.

It is clear that many factors are operating and closely associated with both owned land and acquired land (sharecropping and renting). It is interesting to see that age of the farmer is closely and positively associated with own land and with share transfer (Table 2). This might be due to the fact that farmers at older age have less land to plough than at younger age. The extra land might have been transferred or given away to their children who can plough. It might be due to this effect that the variable age was positively associated with sharecropped/inherited farms whereas it was negatively and closely associated in own farms. Transferred plots or sharecropped plots are acquired mostly by young persons who are also transferred from older farmers in the community through various forms. Youngsters, particularly unmarried, ones are often landless and hence their major source of land could be acquired from older people or parents in the household. Married couples who are youngsters, they often acquired land from their

parents as gifts or even in some cases as sharecropped land. They cannot directly access land from the peasant association, because the distribution has already taken place.

Variables of food shortage, family sizes, and total livestock units have positive association with transferred farms. It might be possible that farms facing food shortages, larger family sizes and having larger number of livestock require additional land. Thus they acquired extra land through transfer of land (sharecropping/gift/rent) from those who have excess land. This picture clearly depicts the need for strategic move or adjustment and investment on land particularly in households with excess labour.

On the other hand, family size, food shortage, and oxen ownership were associated negatively with own land (PA-allocated land), although family size and oxen ownership are not significant in the model. The negative and significant association of food shortage with own land might be the result of more farmland being brought under cultivation, probably due to higher demand for food, which reduces the household food deficit. Distance from major market centres, in both cases, has resulted in a negative association. As most farms are located far away from market centres, the desire to choose farmland for cultivation by importing more land declines. The closer the farm land to the major market centres, the more the propensity will be to acquire additional plot of land. Although, it is negatively associated with own farm (PA-allocated) it did not turn out to be significant. It might be due to the even distribution of PA allocated farms to the owner operator than the sharecropped or rented-in plots. In any case, choice of the land markets depends on infrastructural development. This is indicative of the fact that any investment towards infrastructure is a key to development of land market, be it formal or informal market. *Tef* and wheat production is significantly and positively associated to own cultivated land. This might also be due to the high priority or value accorded to the crops in the diet of the family. Nevertheless, this trend is not similar to imported land for *tef* production. It seems that more priority is given for wheat production to increase household food security than tef production. Normally, the productivity of wheat per hectare of land is higher than that of *tef* , and this could also be the reason for the preferential selection of wheat over tef by farmers. Hence the choice of the farmland (owned or imported) depends on the type of crop produced for a household consumption.

4 Conclusion and Implications

After the redistribution of land in the Amhara region, land markets or exchange of land has taken different forms but mainly based on local institutions. In general, the redistribution of land has a profound effect on equity; some factors are emerging which tend to affect household level total operated farms for crop production. These are oxen ownership, family size, age of the farm households, type of crop produced (mainly *tef* and wheat), input use (inorganic fertilizer) and distances from major plots to market centres. Whether or not types of contract choices were associated with farm specific and human factors were investigated. It is essentially observed that land import for sharecropping and rent-in land for the goal of crop production, functions informally and efficiently.

Table 3: Determinants of tenure arrangement choice-Multinomial probit model Equation imported land (sharecropping+rent-in)

Variables	*Coeff.*	*Std.Err.*	*t-ratio*	*P-value*
LNOXEN	-0.00016	0.0005	-0.275	0.78298
LNTLU	-0.00031	0.0006	-0.376	0.70548
LNAGE	0.507824	0.1618	3.136	0.00136*
LNCULT	-0.00149	0.0013	-1.07	0.28177
LNFAMSIZ	-0.05468	0.3283	-0.166	0.86733
INCOMTOT	-0.00013	0.00016	-0.841	0.40093
FOODSHOR	0.204505	0.24622	0.8305	0.40622
DISTANCE	-0.00248	0.00037	-2.6597	0.050941***
TEFPRODU	0.0001232	0.00044	0.27623	0.782346
WHTPRODU	0.0003011	0.00015	1.88666	0.059209***
HIRELABR	-0.132982	0.33418	-0.3974	0.690686
Equation (RHS) for own land				
LNOXEN	0.0003	0.00096	0.03393	0.97206
LNTLU	-0.0004	0.00113	-0.2945	0.76855
LNAGE	0.46364	0.26282	1.7641	0.07771***
LNCULT	-0.0007	0.0049	-0.0755	0.93979
LNFAMSIZ	0.4186	0.4694	0.89165	0.37257
INCOMTOT	0.000121	0.0002	0.55197	0.58094
FOODSHOR	-1.24674	0.03783	-2.6520	0.081438***
DISTANCE	-0.00041	0.0005	-0.7955	0.42616
TEFPRODU	2.000345	0.0003	2.91709	0.035091***
WHTPRODU	2.0093	0.0002	2.01779	0.067125***
HIRELABR	0.2507	0.5270	0.47575	0.63447

* , ** and *** are significant at 1%, 5% and 10% of significant level

The traditional institutions are playing an important role in the informal market for land to function efficiently. But there are constraints, which affect, both choice of own land (PA-allocated) and imported land (non-PA land). The existence of imperfect markets for oxen, and the associated distance from markets compels us to believe that efforts to improve the functioning of the markets are more likely to improve agricultural efficiency than the land market itself. It may be worthwhile not to totally intervene

with the operation of the informal land markets, but rather to improve the institutional framework under which it operates more efficiently.

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