Determinants of Access to and Ownership of Farming Land Among Rural Youths in Central Region of Malawi

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Abstract

Malawi's economy is highly dependent on agriculture of which 80 percent of those involved in agriculture live in rural areas. On top of that, the highest population of the country consist of the youth in the age category 15 to 39 years. However, the youth still remains the age category in the country with poor access to productive assets. The study analyzed factors affecting rural youth's access and ownership of farming land and employed an Independent Double Hurdle approach. Results showed that among the socioeconomic and institutional factors hypothesized to affect access and ownership of land; age, gender, household size, education level, farm input coupon access and household income positively influenced access to and ownership of land at 1 percent level of statistical significance (P<0.01). The study recommends introducing programs that improves the education levels and incomes of rural youths in order to improve their access and ownership of farming land. The study again recommends empowering rural youthful women in order to improve their ownership of farming land.

Keywords: Access, Land, Rural, Youth, Malaw

1 Introduction

Worldwide, youth unemployment has in recent times become a serious macroeconomic problem. It is a serious problem in developing countries where many youths are concentrated in rural areas, with farming being a major livelihood source. Despite high unemployment rate among the youth, the fact that youth are the most productive age category in the society, cannot be refuted. Thus involving youth in pursuit of productive economic activity is of great importance in poverty reduction, especially in developing countries. If the productivity of youth has to be fully exploited, youth' access to productive assets should be priotized. One important productive asset among others, is land for agricultural production. Land for farming remains an important driver to both participation in agriculture and adoption of new production technologies. Bezu & Holden (2014) investigated land access and livelihood choices among the the youth in Ethiopia. Prime findings in their study show that youth do not have access to adequate land because of scaresity of land and land market complexities existing in the land markets. Due to limited access to land, most youth are naturally driven out of agriculture through emigration to pursue non agricultural actvities in urban areas. In Nigeria, Daudu *et al*. (2009) conducted a study on the role of youths in agriculture. The study isolated lack of adequate land for farming as one of the major problems that prevented youth participation in agriculture. Akpan (2010) also argued that lack of land for farming constrained youth involvement in agriculture in Nigeria. One of the consequences of lack of land for farming is rural-urban migration, a thing that results in urban poverty and social instability especially when youth do not have anything to do in the urban areas where they migrate.

Farming is one of the major livelihood sources in Malawi. According to GoM (2016), agriculture alone contributes to 28 percent of the Gross Domestic Product of the country. The benefits of farming not only limit to contributing to the country's GDP but also to enhancing nutrition and food security status of the country. However, effective nutrition and food security initiatives rely on thorough understanding of the rural farming system (Allen 2014). Indeed almost 80 percent of the Malawian population lives in rural areas depending on agriculture for their livelihoods (NSO 2016). The population of Malawi is however dominated by the youths who are viewed as the future leaders of the country. Thus as future leaders, it is highly expected that they gain access to productive resources in order to help drive the Malawian economy. On the contrary, the youth still remain the age category with poor access to productive assets (GoM 2012).

In countries in which the economy depends highly on agriculture, acquisition of most productive resources is of great importance, especially to most productive age category in the society. Land is one of the most important productive resource that without it, farming is almost impossible. Hichaambwa & Jayne (2014) explained the role that increasing smallholder farmers access to land plays on poverty reduction. The authors found a positive and significant relationship between farm size and agricultural sales in Zambia. To be specific, their study found that accessing a hectare of land reduced poverty rates from 84 percent to 48 percent implying that access to land is a

crucial factor that constrains commercialization and poverty reduction. Control of productive resources thus has a great effect on the livelihoods of rural people (FAO 2010). It should be noted that the youth are the most productive age category and provide a source of labour in major field operations. However, without the right productive resources at their disposal, poverty rates and unemployment still prevail among the youths (Dallavalle 2012). Different organizations and institutions have different definitions of the youth. This study adopts the Ministry of Gender's definition of the youth as those individuals in the age group 15-39 years (GoM 2013).

The youth as the most productive age category need to engage in economic activities. Thus increasing the involvement of youths in agriculture will boost the country's economy. According to Misra & Debertin (2007), economically deprived youth are not only at the risk of poverty for themselves but also the entire society. However, little has been done in ensuring that the youth have the required resources like land in order to engage themselves in farming.

According to FAO (2014), the youth are one of the vulnerable groups with poor access to agricultural productive assets like land in developing countries. IFAD (2004) pointed out the need for investing in young people in order to achieve sustainable development. Access to farming land is one of the necessary pre-requisites for engagement in farming activities by the countries youth. Having access to land entails having a source of livelihood which one can depend on to achieve food security and alleviate poverty (GoM 2016). The youth need to be equipped with productive resources if their livelihoods are to be improved (FAO 2014). On the contrary, the Gender, Children, Youth and Sports joint sector strategic plan of 2013-2017 (GoM 2013) showed that a majority share of land holdings in Malawi is owned by the adult population of ages greater than 40 years. It is for this reason that a study of the determinants of access to and ownership of farming land among the rural youths is imperative. Despite commanding the highest percentage of the population of Malawi, the youth still remain the less privileged group when it comes to control of productive resources.

While a number of studies have established that limited land for farming prevents youth's participation in agriculture, no study has been conducted to unearth factors that determines youth's access to and ownership of agricultural land in Malawi. Dearth of information on determinants of access and ownership of land for farming, presents an information vacuum for evidence based policy making process. Thus researching on access to and ownership of farming land among the youth in rural areas not only fills the observed gap in literature, but it is also of great importance if Malawi's economy is to progress. Assessing the determinants of youth access and ownership of land can provide policy makers with evidence based recommendations that can help in designing effective policies that can improve the control of resources among the youth and hence increase their engagement in economic activities. This is quite important considering that the rural population which consists of more than 80 percent of the national population, depends on agriculture.

The main objective of this study therefore is determine factors that influence youth's access to and ownership of agricultural land in central Malawi. The rest of the paper is organised as follows. Section two consists of methodology of the study. In the methodology, the empirical framework and data sources have been discussed in details. The third section comprises the results and discussions of the study. The last section is conclusion and policy implications of the study.

2 Methodology
2.1 Empirical Framework
This chapter presents the analytical technique employed by the study to meet its objective. The study used the Independent Double Hurdle model in order to analyze the determinants of access to and ownership of farming land among the rural youth in central region of Malawi. According to Wooldridge (2015), the Double Hurdle model consists of two stages which are the participation stage which is presented by the probit model and the extent stage which is presented by the Tobit model.

2.1.1 The Probit Model
Following Wooldridge (2015), the probit model was used to model the socioeconomic factors affecting the rural youth's access to farming land. Since access was a binary variable taking the values 1 if the rural youth had access to farming land and 0 if they did not have access; a binary response model is thus appropriate to model the probability of having access to land. The choice between a logit and probit model however depends on the preference of the researcher as the two only differ in their distribution but gives similar results. The probit model can be presented as follows;

$$Z^* = \alpha + \beta_i X_i + e_i \tag{1}$$
$$Z_i = 0 \text{ if } Z_i < Z^* \tag{2}$$
$$Z_i = 1 \text{ if } Z_i \geq Z^* \tag{3}$$

Where Z_i is a binary variable that takes either values of 1 if the youth had access or 0 if they did not have access; Z_i^* is a latent variable that indexes access to farming land, X is a vector of socioeconomic factors affecting access and B is a vector of parameters to be estimated. Again, e_i is the stochastic error term.

2.1.2 The Tobit Model

Ownership of farming land by the rural youth was analyzed using the Tobit model. Thus in order to analyze the factors that affect the extent (acres) of ownership of farming land among the rural youths, the truncated tobit model was used. The dependent variable consisted of a continuous variable taking the values 0 for those who do access land but failed to own or access (through rent) in that particular season and greater than zero for those who owned land in that particular season. Thus the dependent variable took the values of zero and above. Hence the tobit model was used to censor the zeros observed in the dependent variable. Thus following Wooldridge (2015), the model can be presented as follows;

$$Y^* = \alpha + \beta_i X_i + e_i \qquad (4)$$
$$Y_i = Y_i \; if \; Y^* > 0 \qquad (5)$$
$$Y_i = 0 \; if \; Y^* \leq 0 \qquad (6)$$

Where y_i is the dependent variable taking the values of the number of acres owned by individual, x_i is a vector of socioeconomic and institutional characteristics. β is a vector of parameters to be estimated and e is the stochastic error term.

2.1.3 Test for Sample Selection Bias

Selection bias can be defined as the bias that results from selection of individuals of a sample such that proper randomization is not achieved (Wooldridge 2015). This implies that the sample selected is not representative and the estimates are not unbiased and consistent. This is because individuals who have access to land self-select themselves to the next stage of extent of ownership of land. The Inverse Mills Ratio (IMR) is hence used to test for the null hypothesis of no selection bias. In this case, the econometric model has two stages. The first is the selection equation that determines whether the individual has access to farming land. This is presented by the latent variable Z_i^* in equation (1). The second equation is the extent equation which models the number of acres owned by the individual and is represented by Y^* in equation (4). The selectivity problem however arises when Y_i is observed only when $Z_i = 1$ (access to land) and the error terms of the two equations are correlated. To test for this, we use the inverse mills ratio as given by;

$$E\,(Y_i \,|Z_i^* > 0) = \alpha + \beta_i X_i + \beta_\lambda \lambda_i + e_i \qquad (7)$$

Where the additional value of λ is the Inverse Mills Ratio (IMR). Thus the presence of λ shows the presence of selection bias in the dataset.

2.2 Sources of Data and Data Accessibility Statement

The study used the Fourth Integrated Household Survey data collected by the National Statistical Office (NSO) in 2016. The NSO with the funding of the World Bank collected data on 12447 households across the three regions of Malawi. From the 12447 households, 10175 households are from the rural areas while 2272 households are from the urban areas. The study thus focused on the rural households. To be more specific, the study only considered those youths (15-39 years) in the rural areas of the Central region of Malawi and the sample finally was 1435 households.

The IHS 4 data are part of the World Bank Living Standards Measurement Surveys (LSMS) and can be accessed on http://microdata.worldbank.org/index.php/catalog/2936. The World Bank through the NSO collects data on livelihoods of individuals in different developing countries. The dataset is accessed for free and no charges are attached pertaining to the use of the dataset.

3 Results and Discussion
3.1 Descriptive Statistics

Before estimating the determinants of access to and ownership of farming land among the rural youth in central region of Malawi, descriptive characteristics of the sampled youth were computed to get a picture of the sample. Chi-square and Student t-test for categorical and continuous variables respectively were done to test for significant differences between the youth who had access to land and those who did not. Access to land itself was a binary variable taking the values of 1 if the youth had access and 0 otherwise. It should be noted that access to productive resources by the youth is a very big challenge in Malawi (GoM 2013). The study builds on this as only 22.16 percent of the youth in the Central region have access to farming land. Socioeconomic and institutional factors from literature of youth access to productive resources (GoM 2013; IFAD, 2004; FAO, 2014) were selected to explain access and ownership of farming land. From the factors hypothesized to affect farming land access and extent of ownership; there existed significant differences in the youth that had access to land and those that did not in terms of their age, gender, income, household sizes and education levels. However, the bivariate analysis also showed no significant differences in those that had access to farming land and those that did not in terms of their access to credit and marital status.

Table 1. Socioeconomic and Institutional Characteristics of Respondents

Variable	Access to land (n=318) mean	No Access (n=1117)	P-value
Continuous			
Income (MWK)	63927.31	57022.2	0.001
Age	32.6	31	0.000
Household Size	5.1	4.5	0.000
Binary			
Gender (male=1)	0.6101	0.7028	0.002
Credit access (yes=1)	0.2862	0.2793	0.811
Categorical	**Percentages**		
Marital Status			0.904
Married	77.67	78.78	
Separated/Divorced	17.30	16.83	
Widow/widower	2.83	2.78	
Never married	2.20	1.61	
Education level			0.000
None	83.65	88.81	
Primary	7.23	5.64	
JCE	7.55	2.33	
MSCE	1.26	2.6	
Tertiary	0.31	0.63	
Soil Quality			0.202
Sandy	16.04	21.31	
Between sandy & clay	48.43	52.20	
Clay	30.26	31.76	

3.2 Results of the Econometric Model

3.2.1 Sample Selection Bias

The first step in estimating the model was to test if there exist some sampling bias in our data set. The problem in this case arises when individuals who have access to land in the first stage of the estimation also own land in the next stage of extent of land owned. Thus there can exist some self-selection where Y_i is observed only when Z_i =1 (access to land). Table 2 shows that the value of the lambda from the selectivity bias test was -6.63 with a p-value of 0.547. This implies that we fail to reject the null hypothesis (λ=0) of no selection bias and conclude that there exhibit no sample selection in the data set (Wooldridge, 2015). This is so because not all youths who had access to land owned land. For example, some would have access to land through rent but not own (or rent) land in the survey year. Thus individuals did not self-select themselves in the next stage and hence no correlation of the errors in the participation (Probit model) and extent (Tobit) models. This implied that we run the models independently as they did not share the error term.

Table 2. Selectivity Bias

Selection Bias Test	Lambda (λ)	P-Value
Inverse Mills Ratio	-6.63	0.547

3.2.2 Determinants of Access to Farming Land by the Rural Youths

The first stage of the Independent Double Hurdle model involved estimating the factors affecting access to farming land by the rural youths by using a Probit model. GoM (2013) argued that the youth are one of the vulnerable groups alongside women and lack access to productive resources. Land being the most important productive resource in a rural setting in Malawi, it is thus imperative to analyze the factors affecting the youth's access to farming land.

From Table 3, the overall model was significant at 1 percent (Prob>chi2=0.000<0.01) with an LR chi2 value of 99.01. Marginal effects after a Probit were then computed to analyze the probabilities of accessing land. As hypothesized, household size, age, gender, education level, household income, coupon access and soil type positively and significantly affected the youth's access to farming land; while marital status negatively affected their access to farming land.

The significant positive marginal effect on gender implies that being male increases the probability of the accessing land by 14.14 percent more than being female. GoM (2013) agrees with this as it explained that women are very vulnerable in their access to productive resources and this gets worse to a youthful female. The positive and significant marginal effect on household size implies that an addition person in the household size increases the probability of accessing land by 2.8 percent. This is so as the bigger the household size then the more the

available family labour for farming activities. This finding is in line with the findings of Njeru & Gichimu (2014) who found that household size was a significant factor in explaining youthful household's participation in Agriculture in Ethiopia. The positive sign on age again implies a 0.63 percent probability of accessing farming land as the household head age increases by one year. Indeed the youth lack access to farming land compared to the adult population. Thus access to farming land improves with age. This finding is line with GoM (2013) and Njeru & Gichimu (2014) who found that adults have a higher probability of owning land than the youth.

Again, the positive sign on natural log of income explains that the probability of accessing farming land increases as the income of the youthful households increases. Household income was transformed to its natural logarithmic as there were presence of outliers in the initial observations (Green 2003). Misra & Derbetin (2007) explained that poverty or lack of income is a major constraining factor to access to reproductive assets among the youth. Land remains one of the most expensive productive resource in Malawi. Without proper income, the youth cannot be able to access agricultural land in Malawi.

Attending Junior Certificate Education (JCE) was the only significant education level. Education level was a categorical variable and those who never attained formal education were the reference group. The positive marginal effect implies that attaining JCE increases the probability of accessing land by 23.38 percent more than those who never attained any formal education. This is again in line with the findings of Bezu & Holden (2014) who found that educated youth have a better chance of accessing productive resources than uneducated youth. Education thus plays an important role in the understanding of institutions and also ones involvement in income generating activities.

Type of the soil was another factor that significantly affected access to agricultural land among the rural youth. Soil type was a categorical variable taking values of 1 for sandy soil; 2 for between sand and clay and 3 for clay soil. Sandy soils were in this case the reference category. Based on the results, if the soil of the land is between sand and clay it increases the probability of access to land by 6.67 percent; and if the soil is clay it increases the probability by 7.01 percent more than when the soil is sandy. Pagoulatos *et al.* (2016) found that clay and loam (between sand and clay) soils are fertile and do not easily erode. Thus farmers prefer mostly the loam and clay with regards to agricultural land.

With regards to coupon access, youths who had access to farm input subsidy coupons had a 5.41 percent probability of accessing farming land. Subsidized agricultural inputs reduce the cost of production for smallholder farmers. The youth with their lack of income to support on farm operations do benefit from the cheap inputs and hence increasing their probability of accessing land either through rent or purchase. With regards to the negative and significant sign on separated and widowed marital status, it is indeed difficult for single parent households to access land in rural villages in Malawi comparing to those married households. GoM (2013) explained that widows are among the vulnerable groups in Malawi as inheritance rights are mostly not clearly documented and hence risk losing their access and ownership of productive assets. This is even worse for a youthful widow to access land as their life still remain not well established at a youthful age.

Table 3. Determinants of Access to Farming Land by the Rural Youths

Observable Characteristic	Marginal Effect	Std. Error	P-value
Household Specific			
Gender	0.1414***	0.031	0.000
Household Size	0.0282***	0.007	0.000
Age	0.0063***	0.002	0.008
lnHousehold Income	0.0372**	0.024	0.122
Marital Status			
Separated	-0.0648*	0.034	0.056
Widow	-0.0899*	0.054	0.094
Never married	0.0486	0.101	0.629
Education Level			
Primary	0.074	0.05	0.14
JCE	0.2338***	0.071	0.001
MSCE	-0.1001	0.543	0.65
Tertiary	-0.0525	0.132	0.692
Soil Type			
Between sand and clay	0.0667**	0.026	0.011
Dark Clay Soil	0.0701**	0.03	0.02
Institutional factors			
Credit Access	0.0094	0.024	0.690
Coupon Access	0.0541**	0.023	0.016

*** Significant at 1 percent, ** significant at 5 percent

3.2.3 Determinants of Ownership of Farming land among the Rural Youth

The final stage of the analysis involved analyzing the factors affecting extent of land owned by the rural youthful household heads. This was done in the next stage of the independent double hurdle model which involved estimating a Tobit model. Since there existed some individuals who have access to land but did not own land in the survey season, the dependent variable land size in acres recorded some zeros. This affects the distribution and hence a censored Tobit model was employed to censor the zeros at the lower limit. Marginal effects at means were computed to analyze the extent which the socioeconomic and institutional factors affect ownership of land. According to Wooldridge (2015), the computed marginal effects are scale factors which are conditional probabilities on y>0. Thus to get the actual land sizes in acres, the sample means of the significant variables are multiplied by the scale factor. From Table 4, the overall model was significant at 1 percent (Prob>chi2=0.000<0.01) with an LR chi2 value of 102.57. Among the socioeconomic and institutional factors; household size, household income and education were the factors found to significantly affect extent of land owned by the rural youths in the central region of Malawi.

With regards to household size, the scale factor of the marginal effect was 0.1579 and was significant at 1 percent level of statistical significance. Since the sample mean for household size was 5.1, then a member increase in the household size will increase the size of land owned by 0.8 acres holding the other factors constant. As already argued, household sizes act as a proxy for family labour hence increasing the household's ownership of farming land. The natural log of income was another positive and significant factor influencing size of land owned. The scale factor was 0.5318 and was significant at 1 percent and the sample mean was 10.84. This implies that a Malawi Kwacha increase in the natural log of household income will result into a 5.76 acres increase in the size of the land owned by the rural youth. The youth thus need money to access productive resources like land as evidenced by the positive and significant sign of household income. Lastly, attaining JCE had a positive and significant effect on size of land owned. Education was a categorical variable were no formal education was the reference category. The scale factor for JCE was 0.6675 and the mean was 0.0348. Thus attaining JCE increases the size of the land owned by 0.02 acres more than those with no formal education.

Table 4. Determinants of Ownership of Farming land

Observable Characteristic	Marginal Effect	Std. Error	P-value
Household Specific			
Gender	-0.0981	0.1304	0.452
Household Size	0.1579***	0.032	0.000
Age	-0.0131	0.0096	0.174
lnHousehold Income (Mwk)	0.5318***	0.0971	0.000
Marital Status			
Separated	0.2225	0.159	0.164
Widow	-0.1606	0.3009	0.594
Never married	0.2032	0.3318	0.540
Education Level			
Primary	0.2914	0.1812	0.108
JCE	0.6675***	0.2359	0.005
MSCE	-0.5073	0.2848	0.75
Tertiary	-0.3135	0.6201	0.613
Soil Type			
Between sand and clay	0.0775	0.1134	0.494
Dark Clay Soil	-0.0036	0.1269	0.977
Institutional factors			
Credit Access	0.0657	0.0953	0.491
Coupon Access	-0.0946	0.0934	0.311

***, ** and * represent significance at 1%, 5% and 10% respectively.

4 Conclusions and Recommendations

The youth in Malawi face a big challenge accessing productive resources despite comprising of the majority category of the population. Access to farming land in rural areas by the youth can provide a better source of livelihood and improve their poverty and food security status. However, only 23 percent of the youths in rural areas of the central region have access to land. The study analyzed the factors affecting access to and ownership of land by the rural youths in central region of Malawi and employed an Independent Double Hurdle model. The study found that among the socioeconomic and institutional factors hypothesized to affect access to land, age, gender, household size, education level, access to farm input subsidy coupons and household income positively influenced access to land. Again, among the factors hypothesized to affect extent of ownership of land, household

size, household income and education level were found to positively and significantly affect land owned. The study hence recommends introducing programs that improves the education levels and incomes of rural youths in order to improve their access and ownership of farming land. Again, providing subsidy fertilizer to the youth increases their access to land either through rent or other means. The study recommends distributing more subsidy coupons to youths to improve access to land. Lastly, the study also found out that males were better off than youthful females in accessing land. The study recommends empowering women in order to improve their access to farming land in rural areas.

Declaration of Conflicting interests

The authors hereby declare no conflict of interest with respect to the research, authorship and/or publication of this article.

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