

-RESEARCH ARTICLE-

## THE IMPACT OF MICROFINANCE PROGRAMME PARTICIPATION ON HOUSEHOLD FOOD SECURITY IN MALAWI

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### -Abstract-

This article empirically examines the impact of microfinance programme participation on household food security in Malawi. There has been an increase in the role of micro activities such as microfinancing that target the poor, vulnerable, and marginalised people in development agendas. This makes it essential to assess the effect of micro activities, for example, microfinance programmes on welfare indicators such as food security. The study used cross-sectional data that was collected in Malawi for the Third Integrated Household Survey in 2010-2011. It employed the Heckman Selection Model, which was deemed applicable since the selection to participate in credit programmes is typically non-random. Total real annual consumption per household was used as a proxy to capture household food

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security. The results of the study indicate that females contribute more to the food security state of a household than males. It also established that education level significantly and positively contributes to the state of household food security. Lastly, the study established that households that participated in microfinance programmes experience improvements in their status of food security. In light of this, it recommends that policymakers expedite the operationalisation of microfinance programmes with the intent to increase participation by improving policies such as the Microfinance Policy and Action Plan (2002). There should also be an increase in adult literacy programmes and development of microfinance institutions that target women.

**Key Words:** Agricultural sector, microfinance, food security, household

**JEL Classification:** A10 D10 D13

## 1. INTRODUCTION

The economy of Malawi is heavily dependent on the agricultural sector, which accounts for one-third of that country's Gross Domestic Product (GDP) (Food and Agriculture Organisation [FAO], 2015). Apart from being the main source of income in Malawi, the agricultural sector is also a source of food, since it contributes much to consumption and food levels in the country. The Malawian diet is mainly composed of cereals: primarily maize, starchy roots (cassava and potatoes) and starchy fruits (plantains) (National Statistics Office, 2012). Most of the crops in the dietary needs of most Malawians are grown by poor smallholder subsistence farmers in rural areas of the country. The farmers are engaged in rain-fed agricultural production and account for three-quarters of the country's agricultural production (World Bank, 2008; USAID 2019). However, local agricultural production by smallholder farmers is affected by numerous adverse factors such as unfavourable climatic conditions, low agricultural productivity and poverty, that tend to contribute to widespread food insecurity among the population leading to food crises in the country (FAO, 2015). As a result, many people in the country are affected severely by food shortages that prevail in this situation. Thus, interest in understanding the characteristics, demand and impacts of credit for investment in both agricultural and non-agricultural sectors is becoming more important for the Malawian government because of the increasing role played by small-scale farmers in poverty alleviation and the attainment of food security (Hulme & Mosley 1996; World Bank, 2017).

Household food insecurity remains a major problem in Malawi. The Malawi Vulnerability Assessment of 2015 projected the food insecure population to be 2,833,212; almost countrywide in 25 out of 28 districts (Department of Disaster Management Affairs [DoDMA], 2015). In light of this, quite a number of policies have been developed, and several initiatives have been implemented to achieve food security in Malawi. For instance, small-scale activities that target the rural poor, the marginalised, and the vulnerable, such as microcredit programmes have been developed to improve food security. These programmes have become an important instrument for increasing welfare in many developing countries such as Malawi (Chirwa, 2002). According to Pakrashi Maitra and Islam (2014), an important link exists between microfinance and food security in the sense that participation in credit programmes may lead to ‘investment-led’ benefits that result in three-quarters levels of income, consumption and wealth. In the presence of income from microfinancing organisations, households can diversify their financial resources which increases the resources available to them and releases the budget constraints they face (Ibid).

Overdependence on local agriculture exposes households to periodic unemployment and seasonal fluctuations in food security. However, income emanating from non-agricultural sources, such as microfinance programmes, could safeguard households against such seasonal food insecurity (Pakrashi et al., 2014). Many key players operate in microfinance business in Malawi. These organisations can either exist as Commercial Banks falling under the Banking Act and supervised by the Reserve Bank of Malawi (RBM), or as semi-formal institutions with several legal forms and ownership structures ranging from Non-Governmental Organisations to cooperatives, private and public companies, and parastatals (MCC, 2004). Semi-formal institutions in the microfinance sector are the most active players in providing microcredit to poor households and individuals. In terms of policy aspects, Malawi as a country recently agreed to transition from the Millennium Development Goals to the Sustainable Development Goals (SDGs). The second goal of the SDGs is ‘Zero hunger’ where countries are encouraged to strive to end hunger, achieve food security and improved nutrition and promote sustainable agriculture (Sachs, 2012). Micro activities such as microfinancing are some of the interventions that Malawi has taken to ensure food security in the country. Micro activities are in this case, emphasised because they are better in terms of reaching the poor and marginalised.

Against this backdrop, the present study aims to assess the effect of microfinance programme participation on household food security in Malawi. The specific objectives of the study are to: (i) determine if participation in a formal loan organisation by a household affects food security; (ii) determine if the gender of the household head affects food security; and (iii) determine if the education level of the household head affects food security. This study seeks to fill the gap in testing various factors, including participation, that affect household food security. It also seeks to inform policymakers on the relevance and contribution of small-scale activities such as microfinance programmes in poverty alleviation and welfare improvement of Malawians by conducting a nationwide study on the impact of microfinance on food security.

## 2. LITERATURE REVIEW

Although most microfinance institutions are yet to achieve financial self-sufficiency, there is much evidence that poor households that participate in the formal loan programmes experience benefits accruing from increased levels of income and reduced levels of food insecurity (Hulme & Mosley, 1996). For instance, the success of the Grameen Bank in Bangladesh showed that participation in loan programmes increased the household calorie consumption by 3.11% per day and the per capita consumption per day by 2.034% (Pakrashi et al., 2014). These results further show that when compared to non-participants, households that were involved in loan programmes were able to meet their minimum daily requirements. Also, other than improvement in food, there was a notable improvement in other welfare aspects such as maternal and child nutritional status. Still, programme participation was associated with a significant decline in the prevalence of stunted growth among children under the age of five (Pakrashi et al., 2014).

In Kenya, a study conducted by Mutisya et al. (2016) found that education level had a significant effect on household food security. The probability of being food insecure decreased by 0.019 for a unit increase in the average years of schooling for a household. Educated households were more likely to get better jobs and higher income, and this, in turn, had positive impacts on food security. Furthermore, educated people invested in enterprises which contributed positively to food security. Access to credit by women also leads to positive improvements in household welfare. A study by Annim and Alnaa (2013) found that the participation of rural women in the Upper East Region of Ghana contributed positively to consumption expenditure and poverty reduction in rural households.

The effect of rural women's participation on household food security was a 40 % increase in consumption expenditure.

Both researchers and policymakers generally acknowledge that poor rural households in developing economies lack adequate access to financial resources. The lack of access to finance, in turn, has negative consequences for various aggregate and household-level outcomes, including productivity, food security, nutrition, health and overall welfare (Diagne et al., 1996; Carman and Zamorro, 2016). Most poor households lack access to loans that can be used to improve their living standards. The reasons for this have ranged from the risk aversion of lenders to the punitive cost of credit, the requirement of collateral by most formal institutions and the misdirection of financial institutions towards certain sectors designated as priorities for the government while neglecting those that benefit the poor (Masanjala, 2002). Since most financial institutions, such as banks, require collateral, microfinance institutions have come in to provide capital to the poor, asset less rural households who would otherwise be ineligible to access credit (Pakrashi et al., 2014). The loans acquired help to supplement money for both agricultural (food production) and non-agricultural investments (small enterprises). In Malawi, several studies have been conducted to understand the impacts of microfinance programmes on poverty. However, most of these studies have not put a keen emphasis on the impacts of microfinance programmes on welfare aspects such as food security. Kwataine (2002) conducted a study on the impacts of microfinance programmes on welfare indicators within Zomba rural areas, which found that female-headed households were more likely to experience improvement in food security status than male-headed ones.

Another study conducted in Karonga district (Malawi) by Dunford (2013) found that microfinancing had positive impacts on household welfare indicators. Highly vulnerable households in villages which were enrolled in microfinancing programmes were 11.8% to 16.3 % more likely to exit the worst food security category (severely insecure). Furthermore, they also experienced a 1.3 to a 1.4-point reduction in a continuous food insecurity score relative to vulnerable households that had not been enrolled in any of the microfinance programmes. Increased levels of income from microfinance were associated with improved food security. Therefore, to fully assess the significance of micro activities in development agendas, it is necessary to study the impacts of micro activities such as microfinance activities on a national scale.

### 3. METHODOLOGY

This section presents the methodology of the study, outlining both statistical and econometric methods that were applied.

#### 3.1. Modeling framework and econometric specification

The study used econometric methods to analyse the impact of various variables, at household and individual levels, on food security. It adopts the Heckman Selection model, which was also used by Masanjala (2006). The Heckman Selection model is a two-stage model which was chosen because it has been noted that selection into credit programmes may be non-random. This model thus accounts for any selection bias.

In the first stage, a probit model is estimated to determine participation in a credit programme. The probit model is given as follows:

$$\Pr(d_i = 1) = \Phi(\gamma' Z_i) \quad (1)$$

Where  $d_i$  is the participation status of household  $i$ :  $d_i=1$  if the household was involved in the credit programme and  $d_i=0$  otherwise.  $\Phi(\cdot)$  is the cumulative standard normal distribution and the vector  $Z_i$  contains variables thought to affect a household's decision to participate in a credit programme. These include household level of income, household dependency ratio and household adult population size. The variable for capturing participation is access to a loan.

The model is estimated using a likelihood function:

$$d_i = \Phi(\gamma' Z_i) + v_i \quad (2)$$

The dummy variable for participation  $d_i$  is then estimated and included in the main welfare function that will capture food security. As per the requirement of the Heckman model, the second equation is estimated using Ordinary Least Squares and is given by

$$Y_i = \beta_0 + \beta' X_i + d_i \Delta + \varepsilon_i \quad (3)$$

$Y_i$  is the welfare outcome variable capturing food security and is presented by a proxy, total real annual consumption per household.  $\beta_i$  are the regression coefficients.  $X_i$  is a vector that captures household characteristics including GENDER, a variable capturing gender of the household head. AGE, a variable

capturing age of household head, AGE2 captures square of the age of the household head, EDU captures the education level of the household head, HHSIZE captures the household size, LOCATION captures the location of the household whether urban or rural and  $\varepsilon_i$  is the error term capturing unexplained part of the regression.

In order to have differences in welfare outcomes attributed to participation, a necessary condition is that participants match nonparticipants except for treatment (Masanjala, 2006). When this happens the welfare outcome, food security, is statistically independent of treatment status,  $d_i$  and the equation can be estimated as in (3). But it has been noted that selection in credit programmes is non-random, such that the dummy variable capturing participation  $d_i$  may end up being correlated with an error term  $\varepsilon_i$  and  $E(\varepsilon_i d_i) \neq 0$ .

In order to correct for the correlation between the error term and the dummy variable, Heckman (1988) suggests incorporating the expected value of the selection error term into the equation of the welfare outcome, food security. The correction error term is found by computing the Inverse Mills Ratio given by:

$$\lambda_i = E(v_i | d_i) = \frac{-\phi(\gamma' Z_i)}{1 - \Phi(\gamma' Z_i)} \quad (4)$$

The Inverse Mills Ratio is computed and fitted into the regression. Therefore the empirical welfare equation becomes

$$E(w_i | d_i = 1) = \beta_0 + \beta' X_i + \theta_1 \lambda_1 \quad (5)$$

$$E(w_i | d_i = 0) = \beta_0 + \beta' X_i + \theta_0 \lambda_0 \quad (6)$$

where  $d_i=1$  if the households participated in credit programmes and  $d_i=0$  otherwise.

An empirical problem that is common in this model is finding appropriate identification variables (Masanjala, 2006). Estimation of participation is only possible when  $X_i$  and  $Z_i$  are not common. In this case, the variables in the two models are different; thus, the model can be estimated.

### 3.2. Description of Variables

#### 3.2.1. Dependent Variable

The study uses Total real annual consumption per household as a proxy to capture food security, which is the log of total real annual household consumption. This log is used because the variable may be skewed and taking its log will make it normally distributed (Benoit, 2011).

#### 3.2.2. Independent Variables

The independent variables are described in Table 3.1 as follows,

**Table 3.1: Description of independent variables**

Variable	Description
Gender	Male=1, females=0
Age	The diminishing effect of age on food security will be captured by a quadratic variable, age squared.
Education head	(levels of education for household head)1= no education, 2=primary education, 3=secondary education and 4=tertiary education.
Household size	number of people in a household
Participation	Population that participated in the scheme
Location	Location=1 urban areas, location = 2 for rural areas.

### 3.3. Data source and study design

The study uses data collected by the National Statistics Office in the Third Integrated Household Survey (IHS3) in 2010-2011, where a total of 12480 households were administered. The IHS3 sampling frame is based on information and cartography from the 2008 Malawi Population and Housing Census (PHC) (NSO, 2012). The study is divided into stratum, namely: Northern Region-Rural, Northern Region-Urban, Central Region-Urban, Central Region-Rural, Southern Region-Rural and Southern Region-Urban. The urban area is defined by the four major cities in the country: Mzuzu, Lilongwe, Blantyre and Zomba Municipality. The data in the study are cross-sectional, which implies different characteristics for any household.



## 4. RESULTS AND DISCUSSION

### 4.1. Descriptive Statistics

**Table 4.1: Loan Participation**

<b>Received Loan</b>	<b>Frequency</b>	<b>%</b>
<b>No</b>	10,670	86.95
<b>Yes</b>	1,601	13.05
<b>Total</b>	<b>12,271</b>	<b>100.00</b>

Table 4.1 shows the number of people who participated in formal loan schemes. It shows that 86 % of the sample did not participate in any formal loan organisation, and only 13.05 % participated in loan schemes provided by formal loan organisations.

**Table 4.2: Descriptive Statistics**

<b>Variable</b>	<b>Mean</b>	<b>Std. Dev</b>
<b>Dependency Ratio</b>	0.4612785	0.2634462
<b>Adult population</b>	2.00	1.039785
<b>Income Level</b>	65836.45	90997.51
<b>Household Size</b>	5.00	2.207536
<b>Marital status</b>		
<b>Married (%)</b>	0.7329	
<b>Separated, Divorced (%)</b>	0.1089738	0.3116191
<b>Widow (%)</b>	0.1258456	0.3316888
<b>Never married (%)</b>	0.0322765	0.1767406
<b>Age</b>	42.00	16.22512
<b>Age squared</b>	2039.7	1626.399
<b>Gender</b>	0.75	0.2178613
<b>Education Level</b>		
<b>No education (%)</b>	0.7002936	0.165782
<b>Primary (%)</b>	0.1022672	0.3030117
<b>Secondary (%)</b>	0.1666123	0.3726446
<b>Tertiary (%)</b>	0.0308269	0.1728557
<b>Location (%)</b>	0.8180262	0.3858386
<b>N</b>	<b>12271</b>	

The descriptive statistics in Table 4.2 capture variables for both the first and second regression models that were run in the study. The descriptive statistics show that the average household size was five people per household and that the average age of the household head was 42 years. At least 75% of the households were headed by a male 73% of household heads were married, followed by those who were widowed (12%). The descriptive statistics also show that 10% of household heads were separated or divorced, and 3% had never been married. As for education, 70% of household heads had no education, followed by those with secondary school level education (16.7%). Meanwhile, 10% had primary school as the highest level of education, and the lowest were those who had tertiary

education with 3%. The table also shows that 81% of the households were located in the rural area, while 19% were located in urban areas. In sum, these descriptive statistics indicate that married male shaded most households; most heads had no education, and most households in the study were located in rural areas.

## 4.2. Regression Results

### 4.2.1. Probit (Discrete Choice) Model

Due to the nature of the probit model, the coefficients cannot be interpreted directly to represent probabilities (Gujarati, 2004). In order to interpret them, they have to be at the margin, that is to say, the derivatives are used, and these can be directly interpreted.

**Table 4.3: Marginal effects at Means**

Marginal effects after Probit, Y=Pr (received a loan)

Variable	Margin	Z	P >  z
<b>dependency ratio</b>	-0.0193222 (0.01353)	-1.43	0.153
<b>income level</b>	0.1446e-07*** (0.0000)	4.85	0.000
<b>adult population</b>	0.033163*** (0.003)	10.98	0.000
<b>_cons</b>	-1.448563 (0.0363015)	-39.90	0.000

Standard error in parenthesis, \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Table 4.3 presents results for the first regression model, which employed participation in credit programmes as the dependent variable which had two categories and a dependency ratio, income level and adult population as the independent variables. As indicated, the first variable presented is a dependency ratio which was found to be insignificant; hence, it was omitted. The second variable was the income level, which was found to be significant at 1%. Income level was represented by household expenditure and participation in a formal loan programme. The margin effect result was 0,14, meaning that the probability that income level will increase household participation in the credit programme is 14%. This result is in line with the apriori assumption that households that have

high levels of expenditure tend to seek more sources of income to finance the expenses and are more likely to participate in loan programmes.

The third variable in the regression model was the adult population. The results show that there was a positive relationship between adult population and participation in a loan programme significant at 1%. This is contrary to the apriori assumption. This could be the case perhaps because, in households with higher adult populations, expenses for food, education, health and other necessities are higher, which might lead to the greater participation in microfinance to cover the expenses. From the table, the probability that the adult equivalent population in a household will increase household participation in the credit programme is 3.3%. Section 4.4.2 presents the results of the second regression model.

#### **4.4.2. Determinants of Food Security**

Table 4.4 presents the results of the second part of the regression model, which is the OLS regression. In this regression, participation was included after calculating the Inverse Mills Ratio. In the table of results, this is captured by the variable IMR.

**Table 4.4: Effect of Credit Participation on Food security**

Variable	Coef.	T	P >  t
Age	0.0029034 (0.001835)	1.58	0.114
Age2	0.0000151 (0.0000187)	0.81	0.419
Gender	-0.2445314*** (0.0246115)	-9.94	0.000
<b>Education Level</b>			
Primary	0.1922823*** (0.0160056)	12.01	0.000
Secondary	0.4072453*** (0.0141874)	28.70	0.000
Tertiary	0.9101386*** (0.027323)	33.31	0.000
Household Size	-0.0250615*** (0.004064)	-6.17	0.000
IMR	-2.79551*** (0.0683634)	-40.89	0.000
Location	-0.3780363*** (0.0138708)	-27.25	0.000
_cons	16.87193*** (0.01362955)	123.79	0.000

Standard error in parenthesis, \*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Effects from the independent variables on the dependent variable will be interpreted from Table 6.

### **Age and Gender of the household head**

As indicated in Table 4.4, the first variable in the regression model is age. However, since the variable was found to be insignificant, it was omitted for interpretation. The second variable is Gender of the household, which was found to be significant at 1%. It also shows that there was a negative relationship between gender and food security. Holding other regressors constant, the coefficient for gender shows that men spent 24.4% less than females implying that the male-headed households were less likely to be food secure than the female-headed households. A study by Kwataine (2002) also found similar results and attributed this trend to the higher involvement of women than men in food production.

### **Education level of household head**

The third variable in the regression model was education level of the household, which is significant at 1% and was also found to have a positive influence on food security. Holding other regressors constant, the higher the education level the more likely to be food secure. In this case no education was used as a reference point, meaning those with primary education spent 19.2% more than those with no education, whereas heads with secondary education spent 40.7% more than the reference point and those with tertiary education spent 91% more than the reference point. The results signify that the higher the education level, the more likely to be food secure. This is in line with the apriori assumption as well as a study by Dunga and Dunga (2017). Therefore, higher levels of household head education contribute positively to food security.

### **Household size**

Household size is the fourth variable with a p-value of 0.00. The variable negatively influences food security. Holding other regressors constant, an increase in the household size by one person decreases total real annual consumption of the household by 2.5%.

### **Inverse Mills Ratio (Participation)**

The sixth variable is the Inverse Mills Ratio, which accounts for participation and corrects participation for selection bias. Holding other regressors constant, IMR shows that there is a significant negative selectivity bias among households. As interpreted by Masanjala (2002), a negative selectivity bias shows that those who participated in the program (loan) experience higher levels of the welfare variable,

in this case, food security, and those that did not participate showed lower levels of food security. This implies that the mean total real annual consumption per household is likely to be higher for households that participated in loan programmes than those that did not participate in them. This is in line with the findings of Pakrashi et al. (2014) who conducted a similar study in Bangladesh and found that households that participated in microfinance programmes experienced higher levels of food security, as measured by calorie intake than those who did not participate.

### **Location**

The last variable is location, which was found to be significant at 1%. The study shows that there is a negative relationship between the location of the household and food security. Holding other regressors constant, food security status for a household located in the rural area was lower by 37.8% compared to urban based households.

## **5. CONCLUSIONS**

This study set out to assess the effect of microfinance programme participation on household food security in Malawi. The specific objectives were to assess the effect of gender of household head, education level of household head and participation in microfinance on household food security. This was addressed by running a Heckman Selection model to correct for selection bias. Total real annual consumption per household was used as a proxy for food security.

To assess the effect of gender of the household head on food security, the study hypothesised that the gender of a household head has a significant negative effect on food security. This was because of how the dummy variable, gender, was defined: gender =1 for males and 0 for female. The results from the study are in line with the hypothesised expectation. Men were found to be less involved in food production as well as consumption in a household. Thus they are likely to have a negative effect on food security.

Secondly, the study sought to assess the effect of education level on household food security. It hypothesised that there is a significant positive effect of education level on household food security. From the results, it is evident that those with higher levels of education had higher levels of food security, as shown by the total real annual consumption. For households where the head had tertiary education as the highest level of qualification, food security was highest by 91% while for those that had very little education such as primary education, food security was

expected to increase by only 19.2%. Finally, the overarching goal of the study was to examine the influence of participation in microfinance on household food security. It was hypothesised that participation in credit programmes had a significant positive effect on food security. From the results, as presented by the Inverse Mills Ratio, participation had a positive effect on food security. The negative sign of the Inverse Mills ratio shows that there is a negative selectivity bias. That is to say, for households that participated in microfinance, total real annual consumption increases, while for those who did not, the total real annual consumption decreases.

## **6. POLICY IMPLICATIONS**

The main aim of the study was to analyse the role of small-scale activities such as microfinance programmes in achieving development goals such as ending hunger and improving food security. Since the study found that participation had a positive influence on food security, policymakers should seek to enhance the operationalisation of microfinance institutions so that they are more effective. In order to achieve this policy, such as the Microfinance and Action Plan (2002), should be enhanced to promote and develop a sustainable microfinance industry that provides credit, saving opportunities and other financial services to poor and marginalised people. Furthermore, since most microfinance programmes lack adequate financial resources to enable sustainability, policymakers should seek to integrate funding for microfinance into the national budget as a development agenda in order to ensure their sustainability.

The study also found that the education level of a household head has a positive impact on food security. This supports policies such as Free Primary Education as well as the Adult Literacy Programme that can be used as a means to achieve development through welfare increment. The study also found that men had a negative effect on food security; thus, for policy makers, it is important that policies aimed at increasing food security be targeted specifically towards women. This supports the development of microfinance institutions such as the Foundation for International Community Assistance (FINCA) that provide microfinance to women.

## **7. LIMITATIONS AND AREAS FOR FURTHER STUDY**

The results from the study are important to policy makers in development agendas that seek to be inclusive. However, there was no control over the collection or questions that were asked in order to attain the data in the IHS3. Furthermore,



since the questions in the IHS3 questionnaire were of recall in nature the information may not be accurate in capturing actual situations on the ground.

The study used cross-sectional data, which may be good at capturing various characteristics at the individual household level, but is not adequate in capturing the time dynamics that can enhance a study of this nature. Therefore, similar research can be conducted using panel data to capture the time dynamics in the effect of microfinance programme participation on household food security.

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