OGUAA JOURNAL OF SOCIAL SCIENCES (JOSS)

Volume 7   No. 1   October, 2013

Impact of Microcredit on Poverty Reduction among Rural Women in Ghana: the Case of Upper East Region

I. K. Acheampong[1] S. E. Alnaa[2]
[1]Departemnt of Economics, University of Cape Coast
[2]Department of Accountancy, Bolgatanga
Polytechnic, Bolgatanga Ghana

Abstract
The literature on microfinance reveals that microcredit is a powerful tool in reducing poverty. In consonance with this, the main objective of this study was to verify the impact of microcredit on poverty reduction among rural women in the Upper East Region of Ghana, using the Heckman method of estimation. In pursuance of this, data was collected from 500 women engaged in agro-processing of whom 250 were beneficiaries of microcredit and 250 non-beneficiaries. The results showed the existence of spatial differences in the levels of poverty in the Region. Respondents from Builsa, Kasena-Nankana, Bongo and Bawku West Districts had higher levels of weekly consumption expenditures and for that matter are better off than their counterparts from the Talensi/Nabdan District. Also the number of income generating activities and the number of sources of borrowing have a positive impact on poverty. The predicted weekly mean consumption expenditure indicated that respondents who received microcred: are better off than those who did not receive microcredit as the beneficiaries spend more per week than the non-beneficiaries. By implication, microcredit has a positive impact on poverty reduction among rural women engaged in agro-processing in the Upper East Region. In the light of this, microcredit intervention should be strengthened in the Upper East Region since it has a positive impact on poverty reduction.

Keywords: Poverty, Microcredit, Rural women, Heckman estimation and Ghana

Introduction
It is estimated that about 1.4 billion people in the world live on less than $1.25 per day as at 2005 (World Bank, 2008).Poverty is a major socio-economic problem that has attracted the attention of the UN and this has been articulated as the number one in the Millennium Development Goals (MDGs), to reduce by half the world's population that live on less than $1 per day by 2015. This is so because poverty has the tendency to reduce the ability of the individual to reach their fullest potential.

Against this background, the developing countries who are most challenged by poverty are making concerted efforts at fighting it. These efforts can be

seen particularly in Ghana with the implementation of the Growth and Poverty Reduction Strategy (GPRS I & II) which represent comprehensive policies to support growth and poverty reduction.

Again, various Microfinance[2] (Mf) programmes have been implemented. As noted by Hermes and Lensink (2007), the lack of access to microcredit/ microfinance is generally seen as one of the main reasons why many people in developing economies remain poor. Usually, the poor have no access to loans from the banking system, because they cannot put up acceptable collateral and/or because the costs for banks of screening and monitoring the activities of the poor, and of enforcing their contracts, are too high to make lending to this group profitable.

Since the late 1970s, however, the active poor in developing economies have increasingly gained access to small loans with the help of microfinance programmes. Especially during the past three decades, these programmes have been introduced in many developing economies. As observed by Ledgerwood (1999), the development objectives of microfinance programmes generally include among others the reduction of poverty.

Proponents of microfinance programmes believe that access to small loans creates a virtuous cycle of investment and increases income which can break the vicious cycle of poverty in which many poor people are trapped. It has been argued that the infusion of credit creates opportunities for self-employment for poor borrowers and that this in turn augments their income and leads to increased consumption and investment. Continued access to credit and the process of increased investment increases income yet further (Khan, 2008). It was also argued that, the theory underlying the promotion of microfinance is due to market failure (Bowles, Durlauf & Hoff, 2006; Khan, 2008).

In Ghana as reported by the Ghana Living Standard Survey round five (GLSS5), Poverty has remained a disproportionately rural phenomenon up till now. Eighty-six percent of the total population, who live below the poverty line in Ghana given the upper poverty line of Gh¢370.89, live in the rural areas. The study further indicated that 50% of these rural poor live in rural savannah (Ghana Statistical Service, 2008).

Two nutritionally-based poverty lines are used in measuring poverty in Ghana: A lower poverty line of GH¢288.47 per adult per year which is what is needed to meet the nutritional requirements of household members. Individuals whose total expenditure fall below this line are considered to be

---

[2]For the purpose of this study microfinance and microcredit are used interchangeably

in extreme poverty, since even if they allocated their entire budgets to food, they would not be able to meet their minimum nutrition requirements. An upper poverty line of GH¢370.89 per adult per year: this incorporates both essential food and non-food consumption. Individuals consuming at levels above this can be considered able to purchase enough food to meet their nutritional requirements, and to be able to meet their basic non-food needs (Ghana Statistical Service, 2008).

Women constitute about 51% of the total population in Ghana, and also make a substantial proportion of Ghana's informal business sector. However due to gender inequalities rural women have limited access to financial services both in the formal and in the informal sectors. Rural banks are very unequally distributed, with the fewest in the Upper East, Upper West and Northern Regions of the country. Within these regions, the ratio of banks to rural clients is 1:100 000 compared with the national average of 1:16 000 to 1:26 000 and one bank could serve an area of over 50 000 km^2 (IFAD-Ghana, 2000). F*or the majority of poor people the cost of a trip to a bank is too high*, particularly since the process involved in bank loans often requires several trips. In such a situation *women are usually further handicapped from using rural banks* since they have problems leaving their children and household duties to travel to the bank.

Besides women are mostly not credit worthy as they lack any collateral necessary to access a bank loan. This situation is seen as a major factor that hinders the productivity of women and as such, rendering them vulnerable to income shocks and ultimately loss of economic power. In the event of these, women are marginalised and excluded from major decisions that affect them.

The results of the 2010 population census put the population of the Upper East Region at 1,031,478 of which 534,339 are females (Ghana Statistical Service, 2012). The population is primarily rural (84.3%) and scattered in dispersed settlements. Agriculture constitutes about 66% of the main occupation of the population, with 70% of the population living below the poverty line. This is further compounded by the increase in food insecurity particularly from April to July; about 30% of the population is estimated to be malnourished during this period (Upper East Regional Health Directorate [UERHD], 2006). Women are more affected under this situation since they bear the brunt of providing for the household needs including food.

As one of the poorest Regions with the highest food insecure population in Ghana, it was not surprising that the Upper-East Region was given

considerable financial support in the form of microcredit and other services by various Microfinance Institutions and Development Organisations. Following the Grameen model these Institutions targeted rural women as clients. The concentration is on women because they are considered important agents in the fight against poverty especially in the rural areas. This is because women give high priority to providing basic needs such as health services, water, and education of children (Littlefield, Murduch & Hashemi, 2003).

Microcredit has been universally touted for its ability to have positive impacts on the livelihoods of clients' households and recent studies point to this effect (Ghalib, Malki & Imai, 2011; Imai, Arun & Annim, 2010; Imai & Azam 2010; Gobezie and Garber, 2007). Even though scores of studies have shown positive impacts of microfinance on poverty, other studies point to the contrary (Morduch, 1999; Kiiru, 2008; Kiiru & Mburu, 2006). Kiiru has noted that microfinance cannot be expected as a "magic bullet" against poverty (Kiiru, 2008).

Although anecdotal evidence is often cited pointing to marginal reduction in poverty within the Upper East Region on one hand and increasing activities of Microfinance Institutions within the Region on the other, to the best of our knowledge there is no existing scientific research within the region to establish the link or otherwise. Thus the relevant questions that come to mind are; does microcredit have a positive impact on poverty reduction among rural women? And are there spatial differences in poverty levels? This study therefore seeks to answer these questions.

Methodology
The study employed a quasi-experimental survey. Thus the data for the study was obtained from 250 beneficiaries (treatment group) and 250 non-beneficiaries (control group) of MFI loans in 2011 through a random survey of women engaged in agro-processing in the Upper East Region of Ghana. Questionnaires were administered to the randomly selected respondents in a face-to-face interview. The questions included in the interview were related to, access to microfinance, initial savings, consumption expenditure on basic needs, the number of business activities the woman engages in at the moment, the location of the business and several other socio-demographic characteristics.

Sampling technique and attribution
The sampling procedure of the study for reaching the treatment and control groups was done in a manner to minimise biases that are usually associated with non-experimental impact research. The rationale was to mimic a

randomized control trial. The following highlights some of the strategies employed to minimize spill-over effects, confounding problems, and contamination and selection biases. First, to deal with spill-over effects, the control and treatment groups were selected from different communities. The choice of communities was preceded by a focused group discussion in all the communities in the district. The rationale was to ascertain information on the extent of interaction among communities and gain insight on issues such as the similarity between communities and interventions related to poverty and finance that have been received by communities. Placement bias has been associated with selecting treatment and control groups from different communities. In this study, this is less of a concern as MFIs are situated in the mainly District capital. Thus, the likelihood of the control group indirectly receiving some benefits from the treatment group in view of their access to credit is minimized (Duvendack et al., 2011).

Second, selection bias; as indicated by Duvendack et al. (2011) and Hulme (n.d.) occurs when there is no randomization in the assignment of subjects under study into either treatment or control group. This therefore creates a pre-existing difference between the treatment and the control groups. When this happens it leads to an inconsistent or bias estimate of the impact of the programme intervention. Thus to minimize the problem of selection bias, the study selected respondents with similar characteristics, such engagement in agro-processing business, respondents resident rural communities and other household characteristics. The entrepreneurial drive and ability which is an invisible attribute was there effectively taken care of as well as other economic, physical and social environment.

Thirdly, Contamination; this is said to occur when there is communication about the experiment between groups of participants. That is subjects under study are aware of the study and communicate among themselves about the study. There are three possible outcomes of contamination. Some participants' performance may worsen because they resent being in a less desirable condition; also participants in a less desirable condition may boost their performance so they don't look bad; and diffusion of treatments: control participants learn about a treatment and apply it to themselves. This issue of contamination was taken care of in the study by interviewing individual respondents in each group in their respective homes, so that no one knows of the other in the study. Again the control and treatment groups were selected from different communities (Duvendack et al., 2011; Hulme, n.d.).

Model specification

The idea here was to determine whether one is poor or not by comparing consumption expenditure on basic needs with the absolute (upper) poverty line which was extrapolated using the consumer price index (CPI) of December 2005 and December 2011. This was due to the fact that the data for the study was collected in 2011 and for that matter it was inappropriate to use a poverty line that was determined using data collected in 2005 to compare with consumption expenditure data collected in 2011, hence the extrapolation of poverty line and thus making provision for inflation.

*Dec.*2005 CPI = 183.74

*Dec.*2011 CPI = 371.16

End year inflation for December 2005 to December 2011 was then calculated as:

$$\frac{371.161 - 83.74}{183.74} \times 100 = 102\%$$

Given the GLSS5 poverty line of GH¢370.89 the extrapolated poverty line was determined as:

370.89 x (1 + 1.02) = 749.20

The study used weekly consumption expenditure data, in the light of this provision was made to reflect this in the poverty line by computing a weekly poverty line. Thus:

749.20 ÷ 52 = 14.41

If an individuals' consumption expenditure is given as a function of:

$$C = f(\pi, R_1, \eta, \Omega) \qquad (1)$$

Where C is weekly consumption expenditure on basic needs, π is profit from agro-processing business, R_1 is initial resources, η is a set of household characteristics and Ω is the amount of microcredit received.

We make a strong assumption that consumption expenditure on basic needs has a poverty reduction effect and could be used to determine if one is poor or not.

Thus one is poor if;

$$C = f(\pi, R_1, \eta, \Omega) < 14.41 \qquad (2)$$

141

From the above therefore we can determine the correlates of weekly consumption expenditure or poverty as:

$$C = f(\pi, R_1, \eta, \Omega)$$ (3)

Let $X = \pi, R_1, \eta$

Thus:

$$C = \beta_1 + \beta_2'X + \beta_3\Omega + \mu$$ (4)

We could estimate an OLS model. However Ω suffers from sample selection bias? This is because beneficiaries of microcredit self-select to receive microcredit or not. In the light of this there are unobservable factors which affect Ω but are not included in equation (4) but which have been relegated to the error term (μ)

Therefore: $cov(\Omega, \mu) \neq 0$

Given this situation estimation of equation (4) using OLS, will bias the estimated coefficient of Ω (β_3). This thus calls for the Heckman method of estimation which solves the problem of selection bias. The Heckman is used here because both C and Ω are continuous variables.

Therefore, following (Heckman, 1979) and (Heckman & Vytlacil, 2005).

$$C = \beta_1 + \beta_2'X_1 + \mu$$ (5)

$$\Omega_i = \alpha_1 + \alpha_2'X_1 + \alpha_3 IV_1 + v$$ (6)

Where IV is an additional variable not in equation (5). This satisfies the exclusion restriction requirement for the estimation of the Heckman model.

With: $\begin{pmatrix} \mu \\ v \end{pmatrix} \square\ IIDN\left(\begin{bmatrix} 0 \\ 0 \end{bmatrix}, \begin{bmatrix} 1 & \rho \\ \rho & 1 \end{bmatrix}\right)$

Thus the expected consumption expenditure for those who have received loans is given by the joint density bivariate normally distributed variables and of the formula:

$$E[C_i \mid \Omega_i = 1] = \beta'X_i + \Delta + E[\varepsilon \mid \Omega_i = 1] = \beta'X_i + \Delta + \rho\sigma_\varepsilon \frac{\phi(\gamma'h_i)}{\Phi(\gamma'h_i)}$$ (7)

Where, ϕ is the standard normal density function and Φ is the standard normal cumulative distribution function. The ratio of ϕ and Φ is called the inverse Mill's ratio (IMR) (sometimes also called 'selection hazard'

particularly in the treatment effect model) or control functions and it takes account of possible selection bias. When the coefficient of IMR is positive there are unobserved variables that both increase the probability of selection and a higher than average score on the dependent variable. When the coefficient of IMR is negative there are unobserved variables increasing the probability of selection and the probability of a lower than average score on the dependent variable. The expected consumption expenditure for those who have access without participation in microfinance programme (have not received MFIs loans) is given as:

$$E[C_i \mid \Omega_i = 0] = \beta'X_i + E[\varepsilon \mid \Omega_i = 0] = \beta'X_i - \rho\sigma_\varepsilon \frac{\phi(\gamma'h_i)}{1-\Phi(\gamma'h_i)} \qquad (8)$$

The expected effect of poverty reduction as a result of access to microfinance programme can be calculated as:

$$E[C_i \mid \Omega_i = 1] - E[C_i \mid \Omega_i = 0] = \Delta + \rho\sigma_\varepsilon \frac{\phi(\gamma'h_i)}{\Phi(\gamma'h_i)[1-\Phi(\gamma'h_i)]} \qquad (9)$$

If ρ is positive (negative), then the coefficient estimate of Δ employing the method of OLS will be biased upwards (downwards), but the sample selection term (inverse mills ratio) will correct for this (Imai, Arun and Annim, 2010). The sign and significance of the estimate of $\rho\sigma_\varepsilon$ (λ) shows if selection bias exists.

Empirical Heckman model
The estimation of the Heckman model is preceded first with an estimation of a model for (Ω) total amount of credit received, thus both equations (10) and (11) are estimated together using MLE

$$wk\,\exp end = \beta_0 + \beta_1 hhppl + \beta_2 depend + \beta_3 oldsav + \beta_4 amtprof + \beta_5 numacty + \qquad (10)$$
$$\beta_6 lonsours + \beta_7 kasena + \beta_8 bwest + \beta_9 bongo + \beta_{10} builsa + \beta_{11} frnsours + \mu$$

$$mftotal = \alpha_0 + \alpha_1 hhppl + \alpha_2 depend + \alpha_3 oldsav + \alpha_4 amtprof + \alpha_5 numacty + \alpha_6 lonsours + \qquad (11)$$
$$\alpha_7 hhppbor + \alpha_8 assets + \alpha_9 kasena + \alpha_{10} bwest + \alpha_{11} bongo + \alpha_{12} builsa + \alpha_{13} frnsours + v_i$$

Equation (10) Contains all the elements in (11) except *frnsours* which is an *IV* for the total amount of credit received and also measures the depth of MF. Table one shows the explanation of the variables used for the estimation.

Results and discussion
Table 1 shows the description of the data used for the analysis depend and hhppl are a set of household characteristics denoted by η in the model. The number of dependents in the respondent's household is denoted by depend

with a mean number of three (3) dependents. Also **hhppl** denotes the number of people in the respondent's household and it has a mean of about 7 people in each hold. The variable **frnsours** denotes the number of friends of the respondent who have borrowed from an MFI. This measures the *breadth* of financial services in the community. Usually the number of people in rural areas particularly the poor who are served by MFIs determine the *breadth* of financial services and as such the level of demand for the such financial services.

Table 1: Descriptive Statistics of Variables

Variables	Description	Obs.	Mean	S.Deviation
wkexpend	Weekly expenditure on basic needs	437	25.00	13.615
kasena	Kasena Nankana District (1/0)	437	0.202	0.402
bwest	Bawku west District (1/0)	437	0.198	0.398
builsa	Builsa District (1/0)	437	0.198	0.40
Talensi	Talensi/Nabdan District (1/0)	437	0.202	0.402
bongo	Bongo District(1/0)	437	0.202	0.402
age	Age in years	437	39.951	11.659
depend	Dependants in household	437	3.100	2.121
frnsours	Number of friends with loans	437	2.995	4.547
hhppl	Number of people in household	437	7.032	7.032
mftotal	Total amount of loan received	437	435.714	713.423
hhppbor	Number of household people with loans	437	0.314	0.598
lonsours	Number of borrowing sources	437	1.062	0.381
amtprof	Amount of profit	437	41.732	52.579
numacty	Number of economic activities	437	1.245	1.123
oldsav	Initial savings	437	98.993	133.701
assets	Value of physical assets	437	442.716	1040.845

Source: Field Survey data, 2011

Also **lonsours** measures the number of sources of borrowing that the respondent can actually borrow from within the community when in need of a loan. These sources include both formal (MFIs and Banks) and informal (friends, relatives and money lenders) institutions. Thus lonsours determines the number of these formal and informal financial institutions that the respondent can actually and confidently go to for a loan when in need. Also, **hhppbor** is the number of people in the respondent's household with loans. The mean of hhppbor is given as 0.31 and with a standard deviation of 0.598.

Wkexpend is the weekly consumption expenditure of the respondent on basic needs (food, clothes and rent).

The amount of profit made in a month is denoted by **amtprof** (π). The value of assets owned by the respondents measured in Cedis is denoted by **assets.** The variable **oldsav** (R_1) measures the initial financial resources or savings of the respondent before receipt of loan from a MFI or start of agro-processing business. Again, **mftotal** is the total amount of loan the respondent has received from a MFI. The mean value of **mftotal** is435.714; this means that on the average beneficiaries of microfinance received a total amount of 435.714 cedis in loans from MFI. The variable **numacty** denotes the number of income generating activities that the respondent engages in as at the time of the study.

Kasena, bwest, builsa, talensi and bongo are district dummy variables for Kasena/Nankani, Bawku West, Builsa, Talensi/Nabdan and Bongo Districts respectively. The mean value for each of the Districts is given as 0.202, 0.198, 0.198, 0.202 and 0.202 respectively for Kasena/Nankana, Bawku West, Builsa, Talensi/Nabdan and Bongo Districts. This suggesting about 20% of the respondents are from each of the five Districts. Talensi/Nabdan is used as the reference category in the estimation.

Analysis of Poverty Status of Respondents
This section presents an analysis of the poverty levels among the respondents. The results are presented in Table 2. The analysis indicated that 104 out of the 490 respondents are poor. Out of these 104 poor respondents, 29 are beneficiaries of microfinance while 75 are non-beneficiaries. Again 386 of the respondents are non-poor, of which 220 are beneficiaries of microfinance while the remaining 166 respondents are non-beneficiaries.

Table 2: Poverty status of respondents

	Beneficiaries(1)	Non-beneficiaries(0)	Total
Poor (1)	29	75	104
Non-poor(0)	220	166	386
Total	249	241	490

Source: Computed from field Survey data (2011)

Given the fact that 249 of the respondents are beneficiaries of microfinance of which 220 are non-poor then it evident that microfinance could have played a key role in making them non-poor. This finding is consistent with previous studies that found positive impacts of microfinance on poverty reduction (Gobezie and Garber, 2007; Imai and Azam, 2010; Imai, Arun and Annim, 2010; Ghalib, Malki and Imai, 2011).

Table 3: Measures of Poverty

Headcount ratio (%)	Aggregate poverty gap	Poverty gap ratio (%)
21.224	Gh¢403.365	5.713

Source: Computed from field Survey data, (2011)

The first two classes of FGT poverty measures are presented on Table 3. The headcount ratio is given as 21.224. This suggests that about 21.2% of the respondents live below the weekly poverty line of GH¢14.4. The aggregate poverty gap is also given as GH¢403.365. This means that it will require about GH¢403.365 per week to bring all the respondents to the poverty line or equivalently GH¢3.88 per week per respondent. The extent of poverty measured by the poverty gap ratio is determined as 5.7%.

The Heckman estimation results are presented in Tables 4a and 4b. Table 4a shows the results of the determinants of the amount of microcredit received from a microfinance institution. From Table 4, the results indicate that, Bongo, Kasena/Nankana, Bawku West Districts, number of dependants in the household, number of friends with loans, number of household people with loans, initial savings value of physical assets and the constant are all significant at 1%. Also, amount of profit is significant at 5%, while Builsa District and number of borrowing sources known to the respondent are significant at 10%.

Table 4: Results of Heckman estimation of determinants of amount of microcredit received

Variable	Coefficient	Robust Std. error	Z-value	P-Value
Builsa District(1/0)	-0.387*	0.230	-1.68	0.093
Bongo District(1/0)	-0.854***	0.254	-3.36	0.001
Kasena Nankana District (1/0)	-1.056***	0.244	-4.34	0.000
Bawku West District (1/0)	-1.282***	0.265	-4.83	0.000
Dependants in household	0.102***	0.039	2.64	0.008
Number of people in household	-0.016	0.014	-1.13	0.258
Number of friends with loans	0.317***	0.038	8.41	0.000
Number of household people with loans	1.034***	0.159	6.51	0.000
Number of borrowing sources	-0.140*	0.080	-1.82	0.069
Amount of profit	0.004**	0.002	2.41	0.016
No. of income generating activities	-0.051	0.076	-0.67	0.503
Initial savings	-0.002***	0.001	-3.19	0.001
Value of physical assets	0.001***	0.000	3.05	0.002
Constant	-0.789***	0.215	-3.67	0.000

Source: Computed from field Survey data, (2011)

Note:
1. Talensi/Nabdan District is used as the reference category
2. *= significant at 10%; **= significant at 5%; ***=significant 1%

The coefficients of Builsa, Bongo, Kasena/Nankana and Bawku West Districts variables are given as -0.387, -0.854, -1.056 and -1.282 respectively and are all significant. These indicate that beneficiaries from these Districts received less or lower amounts of loans from microfinance institutions than their counterparts from the Talensi/Nabdan District. The reason adducible to this situation could be that respondents from these districts are more economically well off than their counterparts from the Talensi/Nabdan District and for that matter may not require large amounts of loans.

The number of dependants in the household has a coefficient of 0.102 and this shows that an increase in the number dependents in the respondent's household increases the amount of loan or microcredit that the respondents receive from the microfinance institutions. The possible reason being that, the number of dependents one has creates the need for one to engage in a micro-enterprise so as to generate more income to cater for the needs of these dependents. This calls for additional investment funds from microcredit. Also the coefficients of number of friends with loans and number of household people with loans are given as 0.317and 1.034 respectively, thus an increase in the number of friends with loans and number of household people with loans leads to increases in the total amount of microcredit or loans received from a microfinance institution. More often friends and other household members who have ever taken loans motivate others known to them to also go in for microcredit. Thus the higher the number of people one knows to have ever received microcredit increases the amount of credit they receive ultimately.

Moreover the number of sources of borrowing known to the respondent has a coefficient of -0.140; this indicates that as the number of sources of borrowing increases the amount of microcredit which beneficiaries receive decreases. A possible reason is that, proliferation of sources of borrowing both formal and informal in rural communities has the tendency of exploiting borrowers especially with their (lenders) inclination to sustainability by charging high interest rates so as to meet their operating cost. This point has been well reiterated in Annim (2009). This assertion was confirmed by majority of the non-beneficiaries as they cited among other reasons, high interest rates charged by the MFIs as a reason why they have not taken a loan from an MFI. This brings to the fore the question of sustainability of MFIs particularly those operating in the rural areas as against the goal of poverty reduction.

Again, the coefficients of amount of profit and initial savings are given as 0.004 and -0.002 respectively. It suggests that as ones profit margin increases, the amount of credit one receives also increases. As profit margins increase this motivates the respondents to expand their businesses and so will require more investment funds, hence microcredit. However an increase in initial savings reduces the amount of microcredit that one receives. This could be so because those who have substantial amount of saving may not have to borrow so much from an MFI. Though initial saving is usually a criterion for grant of loans, the results suggests that individuals who are able to raise the initial amount required as a start-up capital for their agro-processing business have tendency of borrowing less amounts from an MFI.

The results of the second stage of Heckman estimation of the correlates or determinants of weekly consumption expenditure (poverty) are presented in Table 5. The results indicate that the Builsa District, Kasena Nankan District, Bawku West District, number borrowing sources known to the respondent and amount of profit are significant at 1%. The number of dependents and the number of income generating activities are also significant at 5%, while Bongo District and rho (ρ) which is the correlation coefficient of μ and v in equations 12 and 13 are also significant at 10%. Given the fact that the coefficient of rho (ρ) is significant, it shows that selection bias exists in the data and has been corrected.

Table 5: Results of Heckman estimation of correlates of poverty (dependent variable: weekly consumption expenditure)

Variable	Coefficient	Robust Std. error	Z-value	P-Value
Builsa District(1/0)	0.357***	0.130	2.75	0.006
Bongo District(1/0)	0.229*	0.137	1.67	0.094
Kasena Nankana District (1/0)	0.390***	0.113	3.46	0.001
Bawku west District (1/0)	0.615***	0.131	4.69	0.000
Dependants in household	0.040**	0.016	2.45	0.014
Number of people in household	-0.018	0.014	-1.30	0.192
Number of friends with loans	0.001	0.008	0.07	0.944
Number of borrowing sources	0.094***	0.034	2.77	0.006
Amount of profit	0.002***	0.001	3.13	0.002
No. of income generating activities	0.153**	0.071	2.16	0.031
Initial savings	0.000	0.000	1.42	0.157
Constant	2.313***	0.199	11.62	0.000
Lambda(mills)	-0.191*	0.115	-1.66	0.097
rho(ρ)	-0.392			
Sigma	0.486			
Wald chi2(13)	66.52***			
Observations	249			

Source: Computed from field Survey data, (2011)

Note:

1. Talensi/Nabdan District is used as the reference category
2. *= significant at 10%; **= significant at 5%; ***=significant 1%

The coefficients of Builsa District, Kasena Nankana District, Bongo District and Bawku West District are given as 0.357, 0.390, 0.229 and 0.615 respectively. This indicates that respondents from these Districts have higher consumption expenditures on basic needs than respondents from the Talensi/Nabdan District.

The reason for this could be that the Bawku, West and Kasena Nankana Districts have vibrant market centres which boost the economic activities of the respondents and this could have a positive impact on the wellbeing of the respondents from this District. The Builsa District can also boast of vibrant farming activities which are expected to positively affect the wellbeing of the people there.

The coefficient of the number of dependents in the household is given as 0.040; this indicates that an increase in the number of dependents in the household leads to an increase in weekly consumption expenditure on basic needs which have a poverty reducing effect. It is possible that the dependents particularly the older ones are usually engaged in some of the

149

household economic activities thereby contributing to the 'household income and so increasing the household consumption expenditure.

Again, holding all other variables constant an increase in the number of income generating activities engaged in by the respondent increases weekly consumption expenditure which has a poverty reduction effect given its coefficient as 0.153. The reason for this being that, income generating activities are suppose to generate additional income, thus presumably the more the number of income generating activities the more one's income thereby reducing the poverty levels. Moreover, the amount of profit has a poverty reducing effect with its coefficient as 0.002; this is so because holding all other variables constant, an increase in the amount of profit will increase consumption expenditure.

Again, the number of borrowing sources known to the respondent has a positive impact on consumption expenditure given its coefficient as 0.094 and this has poverty reducing effect. When households or individuals have or know a number of sources they can easily borrow from in times of need, it enables them to do away with risk-reducing but inefficient income diversification strategies (Eswaran & Kotwal, 1990) and precautionary savings that have negative returns (Deaton, 1989).

Table 6: Predicted Weekly consumption Expenditure

Variable	Mean	Std. Dev.	Min	Max
Beneficiary	3.046	0.325	2.447	5.751
Non-beneficiary	1.520	1.063	0.014	4.425

Source: Computed from field Survey data, (2011)

Table 6 shows the mean weekly consumption expenditures for beneficiaries and non-beneficiaries of microcredit estimated at the means contingent on all the variables that are significant in explaining weekly consumption expenditure as discussed from table. The mean weekly consumption expenditure for beneficiaries is given as ¢3.046 per beneficiary and that of non-beneficiaries is ¢1.520. Using the mean weekly consumption expenditure of the non-beneficiaries as a counterfactual outcome for the beneficiaries therefore, then the beneficiaries would have had a mean weekly consumption expenditure of ¢1.520 if they had not taken various amounts of microcredit, but they now consume ¢3.046 on basic needs per week as a results of receiving microcredit. All things being equal therefore beneficiaries of microcredit spend ¢1.526 per week more than the non-beneficiaries.

Conclusions and policy recommendations

The study sought to evaluate the impact of microcredit on poverty reduction. The Heckman estimation model was employed which solved the problem of selection bias. From the results and findings the conclusions from the study are that:

Microcredit has a positive impact on poverty reduction among rural women since the beneficiaries have higher weekly consumption expenditure than the non-beneficiaries. Again, there are spatial differences in poverty levels among the Districts, with respondents from the Bawku West District having lowest levels of poverty among the Districts under study.

It is therefore recommended that microfinance institutions should endeavour to reach out to more rural women engaged in agro-processing. Microfinance institutions should lend out loans to more clients in communities in Districts with high poverty levels as well as those without vibrant economic activities and market centres.

References

Annim, S. K. (2009). *Targeting the poor versus financial sustainability and external funding: Evidence of microfinance institutions in Ghana. Brooks World Poverty Institute, University of Manchester,* BWPI Working Paper 88. Retrieved February 26, 2011, fromhttp://www.bwpi.manchester.ac.uk

Bowles, S., Durlauf, N. S., Hoff, K. (Eds.). (2006). *Poverty traps.* New Jersey: Princeton University Press.

Deaton, A. (1989). *Savings in developing countries: Theory and review.* In *Proceedings of the World Bank Annual Conference on Development Economics,* ed. S. Fischerand de Tray. Washington, D.C.: World Bank.

Duvendack, M., Palmer-Jones, R., Copestake, J.G., Hooper, L., Loke, Y., & Rao, N. (2011). *What is the evidence of the impact of microfinance on the well-being of poor people?* London: EPPI-Centre, Social Science Research Unit, Institute of Education.

Eswaran, M., and Kotwal, A. (1990).Implications of credit constraints for risk behaviour in less developed economies. *Oxford Economic Papers,* 42(2), 473-482.

Ford Foundation. (2004). *Building Assets to Reduce Poverty and Injustice.* New York: Ford Foundation.

Ghalib, A. K., Malki, I., & Imai, K. S. (2011).*Impact of microfinance and its role in easing poverty of rural households: Estimation from Pakistan.* Discussion paper series no. DP2011 28, Kobe University, Japan, Research Institute for Economics and Business Administration.

Ghana Statistical Service (2008). Ghana living Standard survey: Report of Five Round (GLSS5). Accra: Author.

Ghana Statistical Service (2012). Population and housing census report. Accra: Author.

Heckman, J. (1979). Sample selection bias as a specification error.

Heckman, J. J., & Vytlacil, E. (2005). Structural equations, treatment effects, and econometric policy evaluation. Econometrica, 73(3), 669-738.

Hermes, N., & Lensink, R. (2007). The Empirics of Microfinance: what do we know? *The Economic Journal*, F1-F10.

IFAD, (2000). *Ghana- Women's access to formal financial services.* Retrieved February 12, 2010, from http://www.ifad.org/gender/learning/sector/finance/42.htm.

Imai, K.S., Arun T., & Annim, S.K. (2010).*Microfinance and household poverty reduction: New evidence from India.* Discussion paper series no. DP2010-14, Kobe University, Japan, Research Institute for Economics and Business Administration.

Imai, K.S., & Azam S. (2010). *Does microfinance reduce poverty in Bangladesh? New Evidence from household panel data.* Discussion paper series no. DP2010-24, Kobe University, Japan, Research Institute for Economics and Business Administration.

Khan, A. A. (2008).*Islamic microfinance: Theory, policy and practice.* Birmingham Islamic Relief Worldwide. Retrieved December 13, 2011, fromhttp://www.islamic-relief.com.

Kiiru J. M., (2008).*Microfinance, Entrepreneurship and Rural Development: Empirical Evidence from Makueni District, Kenya.* Centre for Development Research (ZEF) Bonn University, Germany.

Kiiru, J. & Mburu, J. (2006). User costs of joint liability borrowing and their effect on livelihood assets for rural poor households. *International Journal of Women, Social Justice and Human Rights,* July-December 2007 Issue.

Ledgerwood, J. (1999). *Microfinance handbook: An institutional and financial perspective.* Washington, DC: World Bank.

Littlefield, E., Murduch, J., & Hashemi, S. (2003). *Is microfinance an effective strategy to reach the millennium development goals?* Retrieved November 23, 2009, from http://ifmr.ac.in/cmf/wp-content/uploads/2007/06/mf-mdgs-morduch.pdf.

Morduch, J. (1999). *Does microfinance really help the poor? New evidence from flagship programmes in Bangladesh.* New York University: Department of Economics. Retrieved October 08, 2009.

Upper East Regional Health Directorate, (2006). *Annual report.* Bolgatanga: Author.

Wilde, J. (2000). Identification of multiple equation probit models with endogenous dummy regressors. *Economics Letters*, 69: 309-312.

World Bank. (2000). *Poverty Reduction Strategy Papers: A sourcebook.* Washington DC: Author.

World Bank. (2008). *Poverty.* Retrieved May 20, 2011, from http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTP OVERTY/0,,contentMDK:21881954~menuPK:336998~pagePK: 64020865~piPK:149114~theSitePK:336992,00.html.