

## **Impact of Integrated Village Saving and Loan Program: Empirical Evidences from the Northern Part of Ethiopia**

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The ‘minimalist’ approach that once dominated microfinance outreach in the past is now a fading memory. A growing number of studies are suggesting a more ‘integrative’ approach to support the marginalized and ultra-poor households. This study highlights the impact of the integrated programs-Village Saving and Loan (VSL) and Productive Safety Net Programs (PSNP) - in Sekota district, Northern Ethiopia. Endogenous Switching Regression model is fitted to minimize threats of self-selection bias, unobserved characteristics and heterogeneity effect. The result reveals that self-selected participant in the integrated program has a significant and positive impact on monthly consumption expenditure compared with the random participants and non-participants.

**Keywords:** Endogenous switching regression, Heterogeneity effect, Productive Safety Net Programme, Self-selection bias

### **1. INTRODUCTION**

For decades recurrent drought and famine have devastated the living conditions of most rural dwellers in Ethiopia. A blend of manmade and natural factors resulted in a severe and growing food insecurity problem which exposed millions to chronic and transitory food insecurity every year. The policy response for long to this recurring drought and famine was merely averting mass starvation through emergency food aid until 2005; that neither stops depletion of victim’s assets nor sustains their food needs (Gilligan et al., 2009).

There is a debate on whether support for the poor should be credit only or credit plus. The ‘minimalist’ argues that poor need only financial support. They perceive credit as a magic bullet to do away with rampant poverty (Woller and Woodworth, 2001). However, poverty is not the same across borders, and ultimately the same kind of credit treatment might not solve all kinds of poverty. There are in fact ultra-poor who are in need of credit plus services such as food aid because credit alone can only be used for tempting consumption than for triggering productivity (Bateman, 2010).

The ‘integrative’ however argues that poor need credit plus supports if the aim is to pull them out of abject poverty (Woller and Woodworth, 2001). This approach provides a range of social intermediaries, enterprise developments and social services combined with financial services (Ledgerwood, 1998). Bastiaensen and Marchetti (2010) have further argued that ‘integrative’ approach fosters rural microfinance. Conspicuously, the need for alternative model is indispensable to reach out both rural poor and urban slum poor dwellers to fill in the gaps of microfinance outreaching in a cost efficient way. This study mainly focuses on VSL model which is integrated with PSNP and investigate the impact.

### **2. METHOD**

#### **Survey Design**

The empirical evidences on the impact of microcredit are increasingly becoming controversial. This is due to the challenge on methodologies of evaluation. For instance: see Pitt and Khandker(1998), Chemin(2008), McKernan (2002), Khandker (2005), Menon(2006b) and Roodman and Morduch(2009) all authors have used the

same dataset from Bangladesh 1991-92, except that Khandker included dataset from 1998-99. Their findings, however, are divergent and inconclusive. These can partly be attributed to lack of managing biases such as selection bias, unobserved characteristics, and to difference in assumption and estimation technique, etc.

Non-experimental designs have challenges to establish causality (Roodman and Morduch, 2009) because biases stemmed from different sources affect it.

Had it not been too expensive to employ randomized design, it would have been the best way to spurn selection bias. Selection bias has two sources. These are self-selection and programme placement biases. There are three ways to overcome selection bias (Moffitt, 1991). First one is by using instrumental variables. Second one is by using panel data. Last one is by assuming normality in the error distribution of the outcome variable before the treatment happens albeit it is inherently problematic.

### **Description of the Study Area**

The study area, Sekota district, agro-ecological zone is characterized by tepid to cool sub moist mid highland and hot to warm sub moist lowland. The topography characterized by rugged and chained mountain terrains covered with patchy grasses during the small rainy seasons and bare rock for the remaining seasons.

Agriculture is the major livelihood enterprise for most and only very small segment of the rural population lives on non-agricultural activities such as handicraft, trade and as a daily labourer. Crop production is not a promising business due to shortage of farmland, depletion of soil fertility and moisture stress. As a result the district is classified as most food insecure area in the country. However, district has high livestock holdings particularly, small ruminants. Households in the district use livestock holdings as a prime buffering strategy to withstand famine in cases of crop failure.

### **Integrated Programs Intervened in Sekota District**

In 2005 the government of Ethiopia with a consortium of donors started to implement the PSNP to protect and build new assets at household and community levels for rural poor (Gilligan et al., 2009).

CARE International has been working for decades on an alternative model, VSL, which can be implemented in an array of institutional settings ranging from multi-sector rural development projects to stand-alone financial service projects (Allen, 2006). It is heavily based on the traditional saving and lending methods with a small external investment needs in the form of training and other supports. Save the Children UK has adopted CARE's model and implemented VSL in the district since 2008, as one component of PSNP-plus program. PSNP-plus includes: VSL, and livestock fattening, apiculture and horticulture value chains combined PSNP.

VSL launched with the aim of promoting the culture of saving in ultra-poor households and fostering graduation from PSNP. The basic principles of VSL implementation is individuals self-select and form an association of 10 or more members. They pool their savings together from which they can borrow later.

VSL is open to both participants and non-participants of PSNP, but the remaining packages of PSNP-plus program are restricted only to the participants of PSNP.

### **Study Population and Sample**

In this study the non-participants of PSNP are excluded both from the participants and non-participant groups, because the inclusion of them will further exacerbate bias which is intrinsic in the principles of VSL participation. Accordingly 449 households are randomly interviewed; of these 188 were participants and 261 were non-participants in VSL. VSL requires a year to mature (Allen, 2006). This study considered only mature VSLs, which have been operational in 13 Peasant Associations (PAs) since April 2008. Accordingly 188 participant households are randomly selected from 153 VSLs.

Non-participants are households who are identified as future beneficiaries of PSNP-plus program by the district Agricultural Bureau. Accordingly, 261 PSNP participants are randomly selected.

**Model Specification**

Endogenous switching regression model is an extension of classical Heckman selection model, and it is often employed in program evaluation to minimize biases from self-selection and unobserved characteristics (Maddala, 1983).

Let  $Y$  be an outcome variable and  $I$  to be program variable then the usual program evaluation would be:

$$Y = \delta + Z\beta + \delta I + \varepsilon_{it} \tag{1}$$

where  $Z$  is a vector of exogenous variables and  $I$  is a dummy variable which indicates either participation in the program when  $I = 1$  or otherwise when  $I = 0$ . The estimation of  $\delta$  hence shows the program impact.

Let us assume that  $I_i$  be a decision function that determines to which a regime agent is facing, that means, either the agent will decide to participate or not to participate. Let  $\beta_1, \beta_2$  and  $\gamma$  are vectors of parameters, and  $u_i, \varepsilon_{1i}$  and  $\varepsilon_{2i}$  are idiosyncratic error terms with trivariate nominal distribution of mean zero and covariance matrix.

$$I_i^* = \gamma Z_i + u_i \begin{cases} I_i = 1, \text{if } I_i^* > 0 \\ I_i = 0, \text{otherwise} \end{cases} \tag{Decision function} \tag{2}$$

$$\text{Regime 1: } Y_{1i} = \delta_1 + \beta_1 X_i + \varepsilon_{1i} \text{ if } I_i = 1 \text{ (For the participants)} \tag{3}$$

$$\text{Regime 2: } Y_{2i} = \delta_2 + \beta_2 X_i + \varepsilon_{2i} \text{ if } I_i = 0 \text{ (For the non-participants)} \tag{4}$$

$$\Omega = \begin{pmatrix} \sigma_u^2 & \sigma_{1u} & \sigma_{2u} \\ \sigma_{1u} & \sigma_1^2 & . \\ \sigma_{2u} & . & \sigma_2^2 \end{pmatrix}$$

where  $\sigma_u^2$  is a variance of the error term in the decision function, while  $\sigma_1^2$  and  $\sigma_2^2$  are the variance of the error term of equation (3) and (4);  $\sigma_{1u}$  and  $\sigma_{2u}$  are covariance's of  $u_i$  and  $\varepsilon_{1i}$  &  $u_i$  and  $\varepsilon_{2i}$  respectively. However, the covariance between the error term  $\varepsilon_{1i}$  and  $\varepsilon_{2i}$  do not appear because  $Y_{1i}$  and  $Y_{2i}$  will not be observed simultaneously (Lokahin and Sajaia, 2004).  $Y_{1i}$  and  $Y_{2i}$  are expected outcome variable (in this case consumption expenditure).  $X_i^s$  are vectors of exogenous variables both participants and non-participants. Let  $Z_i$  also be a vector of explanatory variables that describes the probability of decision to participate in VSL and identifier variables.

The full-information maximum likelihood method is used that simultaneously fits both the binary and continuous equations (2), (3) and (4) and gives a consistent standard error (Lokshin and Sajaia, 2004).

**Conditional Expectations, Treatment, and Heterogeneity Effects**

The endogenous switching regression model can be used to compare the expected consumption expenditure of the households who participated in VSL 5(a) with respect to the households who did not participate in VSL 5(b), and to investigate the expected consumption expenditure in the counterfactual hypothetical cases 5(c) that the participated households did not participate, and 5(d) that the non-participated household participated. The conditional expectations for consumption expenditure in the four cases are presented in Table 1 and defined as follows:

$$\begin{aligned} (5a) E(Y_{1i} | I_i = 1) &= \beta_1 X_{1i} + \sigma_{1u} \lambda_{1i} & (5c) E(Y_{2i} | I_i = 1) &= \beta_2 X_{1i} + \sigma_{2u} \lambda_{1i} \\ (5b) E(Y_{2i} | I_i = 0) &= \beta_2 X_{2i} + \sigma_{2u} \lambda_{2i} & (5d) E(Y_{1i} | I_i = 1) &= \beta_1 X_{2i} + \sigma_{2u} \lambda_{2i} \end{aligned}$$

Table 1 Conditional Expectations, Treatment, and Heterogeneity Effects

Subsamples	Decision Stage		Treatment Effects
	To Participate	Not to Participate	
Households that participated	$(a)E(Y_{1i}   I_i = 1)$	$(c)E(Y_{2i}   I_i = 1)$	TT
Households that did not participate	$(d)E(Y_{1i}   I_i = 0)$	$(b)E(Y_{2i}   I_i = 0)$	TU
Heterogeneity effects	$H_1$	$H_2$	TH

Note: TT: the effect of the treatment on the treated; TU: the effect of the treatment on the untreated;  $H_i$ : the effect of base heterogeneity for households that participated ( $I=1$ ), and did not participate ( $I=2$ ); TH= (TT - TU), i.e., transitional heterogeneity.

### 3. RESULTS

The covariate parameters sign and magnitude  $\rho_1$  and  $\rho_2$  in table 2, depict that the average monthly consumption expenditure of self-selected participants is greater than that of the random participants. The average monthly consumption expenditure of those who choose not to participate is less than the random non-participants of VSL.

The estimation indicates that participant's monthly consumption expenditure is positively and significantly determined by income, asset holdings, being male-headed and highland dweller; while for non-participants household labour endowment and income are significant and positive determinants.

Table 3 presents the expected consumption expenditure under actual and counterfactual conditions. The expected consumption expenditure of households that participated in VSL is about 6.58 (721 Birr per month), while it is about 6.41 (608 Birr per month) for the households that did not participate. This simple comparison, however, can be misleading unless the counterfactual comparison is taken into account.

Table 3 Average Expected Consumption Expenditure; Treatment and Heterogeneity Effects

Subsamples	Decision Stage		Treatment Effects
	To Participate	Not to Participate	
Households that participated	(a) 6.58 (0.05)	(c)4.13 (0.21)	2.45***
Households that did not participate	(d) 6.26 (0.07)	(b)6.41 (0.05)	-0.15
Heterogeneity effects	0.32*** (0.09)	-2.28 *** (0.19)	2.6***

Note: Values in the bracket are standard errors. \*\*\* Significance at the 5% and 1% levels respectively. All expected mean values are transformed to log. Birr18= \$1US

In the counterfactual case (c), households who actually participated would have consumed about 4.13 (62 Birr per month; that is about 91%) less if they did not participate. In the counterfactual case (d) that households that did not participate had participated in VSL, they would have consumed fairly the same level. In addition, the last row of table 3, which adjusts for the potential heterogeneity in the sample, shows that households who actually participated would have consumed significantly less than the households that did not participate in the counterfactual case (c). In the counterfactual case (d) that the non-participated households had participated, they would have consumed lower than the household that actually participated. The results seem to suggest that households who participated are still better off participating than

not participating, and households who did not participate are still better off not participating than participating.

This highlights that there are some important sources of heterogeneity that make non-participants every times “better consumers” than the participants when they did not participate, and that make participants every times “better consumers” than non-participants if they remain to be participants irrespective of the issue of VSL.

Table 2 Estimation Results of Endogenous Switching Regression Model for Household Consumption Expenditure

Variables	VSL	VSL
	Participants	Non-participant
	$\beta$ (Z-value)	$\beta$ (Z-value)
ln(Income)	0.1944 (5.2400)***	0.1542(5.2200)***
Source of food Consumption		
Purchase	-0.0101(-0.7600)	0.0033(0.9900)
Non-farm	-0.0062(-0.4700)	-0.0059(-1.420)
Transfer	-0.0204(-1.5500)	0.0034(0.8500)
Distress selling	0.0056(0.4100)	0.0158(3.8200)
Own production	-0.0147(-1.1100)	0.0029(0.9100)
Asset	0.0001(2.8600)***	0.0005(3.4100)***
Male	0.4176(3.6800)***	0.1120(0.6600)
Highland (Ref=lowland)	1.0085(2.5800)***	-0.5910(-1.690)**
Mid highland (Ref=lowland)	-0.2039(-1.4700)	0.1262(0.7900)
Age	0.0025(0.0900)	-0.0400(-1.210)
Age square	0.0000(-0.0500)	0.0002(0.7000)
Year of schooling of the HH	-0.0401(-1.6400)	0.0213(0.8600)
Labour	0.0686(1.3300)	0.2504(3.6900)***
Saving	-0.0001(-1.4200)	-0.0020(-1.600)
Borrowing	0.0001(0.7400)	-0.0025(-0.970)
Constant	5.8499(4.0900)	5.1412(6.9400)
$\ln\sigma_{1u}$	0.3697 (-6.900)	
$\ln\sigma_{2u}$		0.0130 (3.2300)
$\operatorname{atanh} \rho_1$	-0.3086(-1.9100*)	
$\operatorname{atanh} \rho_2$		0.5485(2.3100)**
$\sigma_{1u}$	0.6910	
$\sigma_{2u}$		1.0131
$\rho_1$	-0.2992	
$\rho_2$		-0.4994
Wald test $\rho = 0$ [p value]	Chi2= 40.42 [0.0000]	

Note:  $\operatorname{atanh} \rho_k$  is a Fisher transformation is given by  $\operatorname{atanh} \rho_k = \frac{1}{2} \left( \frac{1 + \rho_k}{1 - \rho_k} \right)$  where k = 1, 2. \*, \*\*, & \*\*\* significant levels at 10%, 5% and 1%.

#### 4. CONCLUSIONS

Growing empirical evidences suggest that credit is not a panacea that solves all the problems of the extraordinarily poor. There is growing evidence that the positive impacts of credit are not as big as once were accepted. The ‘minimalist’ perspective that once dominated credit service delivery in the past is starting to diminish. Consequently, new alternative model-Village Saving and Loan (VSL)-is initiated to fill in gaps in microfinance outreaching through a more integrated and cost effective way. In this paper attempts have been made to investigate the impacts of integrated programs (VSL with food aid) on consumption expenditure.

The result depicts that the monthly consumption expenditure of a self-selected participants are significantly higher than that of random participants and non-participants. Participants are better off participating than not participating, and non-participants are fairly the same and better whether they are participating or not participating. This highlights that there are some important sources of transitional heterogeneity effect (i.e. unobserved) irrespective of participation in VSL for the non-participants .

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