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Investigation of Role of Micro Credit in Enhancing Income Diversification of Rural Households in Ethiopia: The Case of Eastern Zone of Tigray

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Abstract: ***This study aimed at investigating the role of microcredit, particularly DECSIs, in enhancing income diversification of rural households in Ethiopia in the case of Eastern zone of Tigray. We have used Tobit Model to estimate the role of microcredit as the dependent variable is censored between 0 and 1. The result confirms that age of the household is non-linearly related with income diversification index. The additional household labor, number of livestock and size of farm land does matter to diversify the household sources of income. However, educational status and marital condition of household head have no contribution for diversifying income sources. Micro credit services have a significant positive impact on the diversification of income***

Keywords: Microcredit, Income Diversification, Tobit and Rural Households

1. Background and Justification

It is a styled fact that poor households can manage risk by having several sources of income at the time when unforeseen shocks happened to their income sources. Households diversify their income sources because returns to their assets endowed in agricultural production are more vulnerable to climate changes and other unforeseen events.

However, the ability to diversify income sources depends on the access to the different types of assets including financial assets. In this regard microfinance institutions are expected to solve the financial constraints of rural households via its credit services. Among poor households, those who received microcredit appear to have been better able to maintain their levels of income diversification than poor households without microcredit (Stefan S. et.al, 2005).

Since microfinance involves provision of multidimensional financial services such as deposits, loans (credit), insurance and money transfers to the poor and low-income households, but here in the study we focused on the importance of microcredit in enhancing the income diversifying effort of rural households in the study area.

Literatures like the work of Manfred Z. (1999) reveals that improved access to micro credit is a means for increasing the poor's income. The provision of micro-credit also strengthens crisis coping mechanisms and diversifies income-earning sources Zaman (2000).

However, there are some scholars, like Elizabeth D. and J. Gordon A. (2001) and Nilufa A. (2005), argued that micro credit services may have negative effects on borrowers. Accordingly, it may have negative impacts on client self-esteem, which may stem from stress relating to the pressure to repay loans.

Dedebit credit and saving institutions (DECSIs) microfinance is established to help the poor and enable them to diversify incomes sources of households in Tigray region. It was established and legally registered by the National Bank of Ethiopia in January 1997 according to Proclamation No.40/1996. So far it has opened 142 branches in the region. Currently it is providing such loan products as agricultural, petty trade, handcrafts, and service loans.

DECSI is taken our target financial institution as it is better to be accessible for rural poor households. DECSI has been operating for the last 16 years, however, as far as the knowledge of the writers, no sufficient studies have been conducted in the eastern zone of the region particularly on the rural households on whether it is playing the intended role or not, particularly on income diversification. Hence this study is intended to assess and examine its role in improving rural household income diversification.

2. Model Specification

In the literature there has been a wide range of different systems in classifying sources of income. Terms like off-farm and non-farm income are used at first glance in a synonymous way, but with slightly different definitions. Ellis (2000) for example defines off-farm income as income originating from wage labor on other farms whereas Barrett, Reardon and Webb (2001) refer to off-farm income as all activities away from the farmers' own property. We follow the classification proposed by Barrett, Reardon and Webb (2001) according to sectors (agriculture and non-agriculture) and functions.

This study investigates the statistical significance of DECSI on income diversifications in the study area. In doing so household income diversification index which is adopted by many researchers is used as an indicator for diversification of income. Accordingly, the study used Herfindahl index which is constructed as the sum of squares of the shares of different income portfolios in the rural household: the smaller the index value, the higher the degree of income diversification (Dimova and Sen, 2010). The Herfindahl income diversification index is given as:

$$HID = \sum_{j=1}^{n} Sj^2 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots 2.0$$

Where; HID is the diversity index and Sj is the share of the total income derived from source j.

Literatures by many researchers like Alobo S (2009) argued that important variables that potentially affect diversifications of rural household income sources are; education level, farm size, access to farm capital such as animal ploughs and micro credit. Thus, for our case, in addition to the aforementioned variables, the model for diversification of household income is developed by incorporating variables such as: household age, family size, number of livestock. Then, Income diversification impact of MFIs can be developed as a function of a set of explanatory variables as follows:

$$ID_i = \sum_{i=1}^{n} \beta_i Z_i + \varepsilon_i \quad \ldots\ldots\ldots\ldots\ldots\ldots 2.1$$

Where; Zi are a set of variables, which are listed above, that affect Income diversification of rural households and ε_i is error term (disturbuns) which is an important concept in econometrics to account non-observable variables and measurement errors. Finally, the job of the researchers is obtaining a consistent and efficient estimate of coefficients (βs). Thus, the writers used Tobit model as estimation technique of regression as it is best suited for censored outcomes. That is the dependent variables (diversification index) lies between 0 and 1 and hence we used a censored type model of Tobit. Diversification index of zero stands for perfectly diversified whereas one indicates the single income sources of a household. Therefore, we apply Tobit model, which have been originally developed for censored data, but which are also used for corner solution models (Wooldridge, 2002).

Table 1: Tobit Model Regression Result

Tobit estimates of the model: dependent variable; income diversification index				
Variable	Coefficient	Std.err	T-ratio(probability)	Marginal effect
AEQ	-0.35	0.061	-5.7 [0.000]***	-0.35
HHAGE	-0.51	0.28	-1.877 [0.063]*	-0.51
HHAGE2	0.08	0.033	2. 42 [0.0208]**	0.08
HHSEX	5.06	7.02	0.72 [0.330]	5.06
MARITAL STATUS	1.30	7.87	0.17 [0.868]	1.30
HHEDU	-1.60	1.55	-1.04 [0.301]	-1.60
CREDIT	-0.08	0.024	-3.45 [0.001]***	-0.08
FARMSIZE	-1.22	0.340	-3.60 [0.000]***	-1.22
TLU	-1.74	0.93	-1.87 [0.063] *	-1.74
Constant	47.65	31.38	1.52 [0.130]	-
LR chi2(9) = 28.52(0.0008) Pseudo R2 = 0.45				

Note: it is the belief of writers that age household head may have non-linear relationship with diversification index. It is likely to expect up to some turning point the higher the age of household head, the more he/she is able to diversify their income sources. Thus, here we include square of ***household head's age (Hhage2)*** *as explanatory variable. And* *, ** and *** indicates significance at 10%, 5% and 1% level of *significance.*

The diagnostic test of likelihood ratio test (LR = 28.52) and pseudo R squared reveals that though there appear some insignificant variables independently, yet all them jointly are powerful and significant to determine dependent variable (income diversification index). Therefore, we can make sure that the model is quite good in explaining the endogenous variable and also about 45% the variation in the dependent variable is well explained by the variables involved in the model jointly.

The result confirms that the larger number of household members (AEQ), the lower the diversification index and hence the more they are able to diversify their sources of income. For our case, the lower diversification index indicates the more diversified income sources and vice versa. On average and at normal condition, an additional labor force in the household lowers the index by about 0.35 units. Hence, a small farm household will get the chance to use the household labor for different production purposes and will enhance the number of income origins.

It is not surprising to observe non-linear relationship between age of a household head and diversification index. That is a household head found in the working age group is capable of diversifying his/her income sources and as age goes to old age level, he/she may relay on other household members and less likely to be powerful enough to diversify the sources of incomes. Accordingly, a negative and a significant, at the conventional level of significance, coefficient for household age (Hhage) implies the higher age of household head, up to some turning point, lower the diversification index and hence the more diversified his/her sources of income (household head with less age) vice versa at higher age level.

The result also confirms difference in gender of households and being heterogeneous in marital status doesn't matter while diversifying the income sources. That is being man or woman headed household is not a challenge phenomenon rather our attitude towards small agribusiness and diversifying the base of income origins. Moreover, education is not powerful in improving the income diversification issues in the study area. However, here it is better to understand that; it does not mean that education has no role for improving income diversifications rather the result is outcome of a survey of small holder farmers where majority of them are not attending modern education centers and hence only few of them are capable of write and read their mother tongue. Thus, in the study area, households are running their daily business activates based on their custom practices and hence education has little role.

Microcredit services rendered to households is still playing crucial in the making them to diversify their source of income. The result confirms our hypothesis that the greater the amount of credit, the more they are likely be able to enhance the number of their income sources. That is the sizes of loan, to some extent, do matter in diversifying the sources of income like in petty trade, bee keeping, dairy farming, husbandry, etc. This is because Dedebit micro finance has played a significant role in reducing the financial constraints that challenges the smooth running of economic activities of small farm holders and hence become a good fortune in helping the rural poor household to have more than one sources of income. Since, the more diversified sources of income, they become better off and the less likely be affected by some unforeseen shocks and events.

Therefore, improved access to credit is seen as an effective means for increasing the poor's income and the bases of income sources besides it smoothes consumption and household savings. Accordingly, the result ensures that on average households diversifying their sources of income by about 8% as amount of loan provided increases by a unit. Moreover, the larger the size of households' farm land and the greater the number of livestock (measured by tropical livestock unit (TUL)), the more likely they improve and diversifies sources of income.

3. Conclusion

The paper is aimed at investigating the role of micro credit services, particularly DECSIs, in enhancing income diversification of rural households in eastern zone of Tigray. Accordingly, we have taken three woredas, namely kilitawulalo, Saesi Tsadamba and Atsbi Wonberta as our target area and a sample of 80, 81 and 76 clients of DECSI, from the respective woredas as representative units.We have used Tobit model to estimate the role of microcredit, along with other explanatory variables, in enhancing the number of income sources because the dependent variable is censored between 0 and 1.

The result confirms that age of the household is non-linearly related with income diversification index. That is up to some level, a rise in household head's age lower the income diversification index and hence the lower the index value, the more the income sources diversified and vice versa.

We can conclude that the additional household labor, number of livestock and size of farm land does matter to diversify the household sources of income. However, educational status and marital condition of household head have no any contribution for diversifying income sources.

Micro credit services have a significant positive impact on the diversification of income. Households that received a formal loan have diversified their income.

Since we have seen that household head's education has not a role for improving income sources diversification hence it is better to give a due attention for training programs to create awareness about innovation agri-business. Majority of rural economic activities are run by traditional farm practices and customs of our ancestor as most of farm households are not attending formal education.

The current emphasis on micro credit is not misplaced and a continued innovation and improvement of rural micro credit schemes help to promote diversified income sources.

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