J Hum Ecol, 38(2): 125-133 (2012)
PRINT: ISSN 0970-9274 ONLINE: ISSN 2456-6608 DOI: 10.31901/24566608.2012/38.02.05

Impact of Livestock Credit and Socio-Economic Variables on Poverty: A Simulation Study of Rural Households in Eastern Hararghe Zone of Oromia Region, Ethiopia

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KEYWORDS FGT Poverty Indices. Household Expenditure. Productive Safety Net. Simulation

ABSTRACT This study was carried out at Fadis District of Ethiopia with the specific objectives of identifying determinants of poverty, analyzing impact of livestock credit and simulating the effect of change in significant covariates on household poverty as measured by consumption expenditure per adult equivalent (AE). Data was generated through face-to-face interview of 140 rural households. For analytical purpose, descriptive statistics, poverty measurement, ordinary least square regression, and simulation techniques were applied. The result of the multivariate regression revealed that family size in AE, highest education grade completed by any household member in years, size of land cultivated per AE, number of crops cultivated, age of household head in years, livestock holding, amount of credit received, frequency of extension visit and number of sick individual in the year have statistically significant coefficients. However, the sign of the latter two variables was not as expected. The simulation result indicated the specific contribution and magnitude in increasing consumption expenditure and reduction of different poverty indices as a result of marginal change in significant explanatory variables that affect poverty status. All simulations, reduction of family size to mean, increase education level of household members, increase land holding, increase in number of crops grown, increase in livestock holding, and expand credit to reach all households showed an effect of increasing mean household consumption expenditure and hence reduce poverty level of households. Thus policy makers should need to consider these specific factors in planning of poverty reduction strategies and interventions in the study and similar rural areas depending on magnitude of their contribution.

INTRODUCTION

Ethiopia is among the low income countries of the world and ranks among the lowest for most human development indicators (World Bank 2010). The Ethiopian economy is highly vulnerable to droughts and adverse terms of trade by virtue of its dependence on primary commodities and rain-fed agriculture. Thus the country's growth performance is highly correlated with weather conditions. A 1% change in average annual rainfall is associated with a change of 0.3% in real GDP in the following year (Mwanakatwe and Barrow 2010).

The Sustainable Development and Poverty Reduction Program (PASDEP) of the government of Ethiopia has intensified sectoral programs in health, education, and infrastructure to achieve the MDGs which underscore the centrality of poverty reduction (Carter and Barrett 2005; MOFED 2006). PASDEP has put in place a new program for food security, the Productive Safety Net Program (PSNP), and made some improvements to the strategy of agricultural development-led industrialization. The PSNP is aimed at addressing the food gaps of chronically food insecure households. It represents a much more coherent and predictable program of community asset building than the previous system of emergency appeals for food aid (Tassew et al. 2008). It is linked to asset-building of the chronically food insecure households. In line with this, different food insecurity and poverty reduction projects have been implemented in Oromia National Regional State. The Food Security Project financed by World Bank and other co-financers is among the largest project found under implementation in the region since 2003.

The study area, Fadis district is one of the major project locations in East Hararghe zone of Oromia region. The project implementation started in 2005 and until mid-2009 about Birr 6 million was transferred to the district and more than 3700 households have benefited. Major portion of the fund was allocated for household asset building and income generating activity. About 96% this fund was used by beneficiary households for livestock credit as a revolving fund (DPPC 2009).

Several factors could be contributing to the effectiveness of such interventions in improving the well-being of target beneficiaries. Based on social and cultural behavior of communities, sex of household head could play an imperative role in determining household well-being (Datt and Jolliffe 1999; Bigsten et al. 2002; Bogale et al. 2002). Albert and Collado (2004) reported that households headed by younger individuals tend to be poorer than those headed by older persons. The role of family size in determining per capita expenditure has also been well examined (Mulat et al. 2003; Geda et al. 2005). Education level could measure the household's human capital and therefore attainment of higher level of education is expected to provide higher levels of household welfare (Datt et al. 2000). Losses of farm land to other uses because of population pressure and limits to the amount of suitable new land that can be brought into production is one of the constraints that can drive rural households to poverty (Ehrlich et al. 1992). Earlier theoretical and empirical works have also emphasized on the importance of livestock holding, distance to public services, availability and access to credit, and use of yield enhancing technologies including high yielding varieties and fertilizer in determining rural households' well-being (Anbes 2003; Khandker 2005; Elias 2007; Dercon et al. 2008; Bogale and Shimelis 2009).

This study will focus on household level impact of livestock credit and other socio-economic variables on poverty indicators. The hypothesis of particular interest to be tested will be "participation in livestock credit program leads to increases in household welfare" which was actually measured by household consumption expenditure and used as a proxy for household poverty status. The paper also presents simulation results of other relevant variables as they impact household expenditure.

METHODOLOGY

Description of the Study Area and Data Sources

The data for this study was based on household survey carried out in Fedis District of the East Hararghe zone in Oromiya Regional state, Ethiopia. Based on the altitude, moisture and physiography, the study area can be categorized into two agro-climatic zones, the midland and lowland which account for 39% and 61% of the total area, respectively. The climate of the area is characterized by warm and dry weather with relatively low precipitation. It receives a bimodal type of rainfall, *Belg*[1] and *Maher*[2] rain.

Agriculture is the major source of livelihood of the community. However, its productivity is dependent on the merit of rain-fed agriculture. The farming system is subsistence type dominated by smallholder farmers. Sorghum and maize crops take the largest proportion of crop production. The farming system mainly relies on mono-cropping, and absence of improved farming practices have resulted in low productivity of crops. Even though livestock keeping constitutes an important activity, many households lost their livestock assets due to recurrent drought.

The primary data for this study was collected through structured questionnaire from 140 sample households, 70 credit users and 70 non-users. Credit users are those households who received the livestock credit before 3 years from survey year (2009) while the non-user households are those who were initially targeted for credit but have not received. The credit users were selected using systematic random sampling method from among the list of credit users. Data was collected on socio-economic and demographic characteristics, resource endowment, access to community services, access to livestock credit, consumption expenditure, and production activities of the households.

Empirical Methods

In order to analyze the household level data collected for the study, various empirical methods have been used. These are econometrics model (multiple linear regression), and Foster, Greer and Thorbecke (1984) decomposable poverty measure and poverty simulation. In the process of modeling the determinants of poverty, attempts were made to identify and quantify the link between different household and community variables with poverty.

Two approaches can be distinguished in modeling the determinants of poverty. The first approach represents poverty as binary choice model where the endogenous variable is expressed as dummy variable, with 1 representing the household being poor and 0 otherwise. The second approach expresses household level poverty based on consumption indicator of well-being and defines poverty in terms of the household's per capita consumption level (World Bank, 2002; Mulat et al. 2003). Many researchers have successfully employed the later model (Mulat et al. 2003; Solomon 2005) to study dimension and determinants of poverty in rural Ethiopia. Moreover, in many developing countries, with which Ethiopia shares similar experiences, OLS model has been successfully applied to assess determinants of poverty (Datt and Jolliffe 1999; Datt et al. 2000; Albert and Collado 2004).

The approach used in this study is log-linear regression model to analyze the determinants of household consumption expenditure. The natural log of household consumption expenditure per AE is used as the dependent variable because its distribution more closely approximates the normal distribution. The simple mathematical expression of the model is given by:

$$1nC_i = \beta^i X_i + \varepsilon i \qquad (1)$$

Where: C_i is consumption expenditure per adult equivalent of household i;
X_i is the set of independent variables that are hypothesized to determine consumption expenditure which includes household and community characteristics; and
εi is a vector of coefficients to be estimated on these independent variables,
εi_i is a stochastic term assumed to be normally distributed with $\varepsilon i_i \sim N(0, S^2)$.
S^2 is the variance of the regression

Using the estimated parameters of the model, predictions of consumption per adult equivalent for each household i can be generated and that makes it possible to compute the probability of a household to be classified as poor. Moreover, associated with any given level of predicted consumption, it is possible to derive all three indices of poverty, namely head count, poverty gap and severity of poverty (Foster et al. 1984) following Datt et al. (2000) and Mulat et al. (2003).

Finally, the aggregate poverty level ($\hat{P}_\alpha$) of the sample was calculated as the weighted mean of the above household poverty measures, where the weights are given by households' size (h_i). Mathematically it can be expressed as:

$$\overset{0}{P}_a = \frac{\left(\sum_{i-1}^{n} h_i P_{ai}\right)}{\left(\sum_{i-1}^{n} h_i\right)} \qquad (2)$$

This formulation of determinants of poverty with its various correlates can be used to simulate the impact of various policies and changes in socio-economic factors on poverty by changing the level of significant explanatory variable.

RESULTS AND DISCUSSION

Demographic and Socio-economic Characteristics

In a country like Ethiopia where agriculture is traditional and mainly dependent on family labor, demographic factors have significant influence on productivity and hence determine households' living condition. The sample was composed of both male and female headed households. Of the total sample households 72.9% and 27.1% were male and female headed household, respectively. Female headed households represent about 20% and 34% from credit non-user and user groups respectively.

Table 1 presents the distribution of sample household heads by credit access alongside other demographic and socio-economic characteristics . The average age of the non-users was 35.96 years while that of the users was 35.17 years. The mean age difference test between the

Table 1: Distribution of sample households by socio-economic characteristics and credit access

Variable	*Non-user*		*User*		*Total*		*t-value*
	Mean	*Std*	*Mean*	*Std*	*Mean*	*Std*	
Age of household head (yrs)	35.96	9.21	35.17	7.2	35.56	8.24	0.56
Family size in AE	4.30	1.44	4.31	1.48	4.30	1.46	0.032
Education (yrs)	2.27	1.95	3.26	1.88	2.48	2.4	0.092
Land holding (ha)	0.765	0.36	0.689	0.19	0.727	0.21	1.537
Livestock holding per AE (TLU)	0.41	.28	0.57	0.38	0.49	0.34	2.13**

***,**,* indicates significance of variables at 1%, 5%, and 10% probability level, respectively; AE stands for adult equivalent credit non-users and users was found to be statistically insignificant. The mean family size of the sample households was 4.3 in adult equivalent . The mean difference test of family size was statistically insignificant. The sample household size in AE ranges between 1.6 to 8.26 for non-users and 2.36 to 9.82 for the credit users.

The average size of own-cultivated land was 0.73 ha, with 0.25 ha being the minimum and 2.25 ha being the maximum landholding. Credit users and non-users cultivated, on average, 0.689 ha and 0.765 ha, respectively. The mean difference test of cultivated land holding between the two groups was statistically insignificant. All sampled households possess their own farmland whatever small it is. About 47% of the non-users and 52.9 % of the users expressed that their landholding was too small to satisfy home consumption.

Effort has been made to assess the ownership of livestock and its value for both groups. Accordingly, the study results revealed that the maximum livestock holding for sample households was 6.4 Tropical Livestock Unit (TLU) whereas the minimum was zero. On average credit non-users and users owned 1.67 and 2.29 TLU respectively. The mean difference test of livestock holding for the two groups was statistically significant at 5% probability level. Similarly, the difference between the average livestock size per adult for the non-user and user group, which were 0.41 and 0.57 TLU, respectively is statistically significant at 5% probability level. On average non-users possessed livestock worth Birr 3245 whereas the users owned livestock worth Birr 5191. This relatively higher value of livestock holding by credit users may be attributed to their credit access and relatively better engagement in livestock fattening and marketing business.

Understanding the importance of infrastructure in supporting socio-economic development is important to highlight the accessibility of those social services in terms of proximity in walking hours taken by sampled households. Accordingly, the mean distance travelled to reach basic social services were analyzed for credit users and non-users. The results indicated that sample households travel on average between 34 minutes to 2:35 hours to health services, market centres, schools and water sources.

Household Consumption Expenditure

The overall households mean real consumption expenditure per AE for the sample households was Birr 1350.20. The mean consumption expenditure for credit non-users and user groups were Birr 1265.57 and 1434.96 respectively based on December 2006 constant price. The mean difference test of consumption expenditure for the two groups was statistically significant at 10% probability level. The mean share of food and non-food expenditure to total expenditure was found to be 66 and 34%, respectively (Table 2).

Moreover, the share of non-food expenditure was significantly higher for credit users than non-users. This implies that credit might have contributed for households to satisfy their non-food needs better.

Determination of Poverty Line and Poverty Indices

In order to determine poverty line, the cost of basic needs method was applied. In the first run a 'basket' of food items typically consumed by the poor were identified from the food consumption questionnaire. The quantity of the

Table 2: Comparison of mean consumption expenditure per AE in real terms

Expenditure type and percent shares	*Non-user*		*User*		*Total*		*t- value*
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*	
Food consumption expenditure (Br)	903.95	396.60	878.82	419.8	891.38	407.13	0.364
Non-food consumption(Br)	361.63	175.65	556.16	212.9	458.89	217.58	-5.89***
Total consumption expenditure (Br)	1265.57	499.49	1434.96	545.9	1350.2	528.21	-1.915*
Percent share of food expenditure	71.43		61.24		66.02		
Percent share non-food expenditure	28.57		38.76		33.98		

***,**,*indicates significance of variables at 1%, 5%, and 10% probability level, respectively basket is determined in such a way that the given bundle meets the predetermined level of minimum caloric requirement that is, 2200 kilocalorie per day per adult (WHO 1985). This 'basket' was valued at local prices and the value of food poverty line was determined. As a result, the food poverty line was estimated at Birr 1376.07 per year.

To account for the non-food expenditure and identify the total poverty line, non-food expenditure pattern of households whose total expenditure lies between +/- 10% of the calculated food poverty line was examined. Thus households whose total expenditure value lies between Birr 1238.46 and 1513.67 were evaluated to estimate their average share of food expenditure. Accordingly, 19 households were identified and their food to total expenditure ratio was calculated. The average share of their food expenditure was taken as average Engle coefficient and the inverse was used to calculate the total poverty line. Accordingly the average food expenditure share was found to be 72.34%. Thus the total poverty line is found to be Birr 1902 per adult equivalent per year in nominal terms.

In order to possibly compare these figures with nationwide figures and consider the effect of inflation, this poverty line figure was deflated by the survey month food and non-food consumer price indexes (CPI) of Oromiya region, which were 192.2 and 163.1% respectively (CSA 2009). Thus the deflated food and total poverty lines are found to be Birr 716 and 1039 per adult equivalent per year respectively at December 2006 constant price. These results were extensively used in the subsequent analysis of poverty.

Using this poverty line and per adult equivalent consumption level obtained from the estimated model, the Foster, Greer, and Thorbecke (FGT) (1984) class of poverty indices were estimated for each household. As shown in Table 3, the resulting poverty indices reveals that the percentage of poor people measured in head count index ($\alpha = 0$) is 38.18%**.** This figure indicates that about 38% of the sample households live in absolute poverty. This poverty index was very close to the national figure reported by MOFED (2006) which was 39.3% for rural areas.

The poverty gap index (α=1), a measure that captures the mean aggregate consumption short fall relative to the poverty line, was found to be 6.26% with a value of 6.63% and 5.88% for credit non-users and users groups respectively. This index provides information on the budget required to lift all the poor households out of poverty. Similarly, the poverty severity index (α=2) in consumption expenditure was found to be 1.4% implying a mild inequality within poor households. This is 1.3 point lower than the national average poverty severity index for rural areas (2.7%) in Ethiopia.

Table 3: Mean consumption expenditure and poverty indexes

Statistics/Indexes	*Value*
Mean consumption expenditure per ≠AE per year (Birr)	1350.20
Poverty line using current price (Birr)	1902.00
Poverty line using December 2006 constant price (Birr)	1039.00
Poverty head count index	38.18
Poverty gap index	6.26
Poverty severity index	1.40

Determinants of Consumption Expenditure

Selected explanatory variables were used to estimate the log-linear regression model to analyze the determinants of household consumption expenditure using SPSS version 16. Table 4 presents the parameter estimates, t-ratio and P-values for the model. For a cross-sectional data, the fit of the regression model is good, with adjusted R^2 of 0.638. The F- test result also showed that the variables included in the model have high joint significance. In general, the model performed well. Therefore, it is possible to interpret the model results meaningfully.

With only few exceptions, the signs on the variables are as expected, and the relative magnitudes are also reasonable. Since the dependent variable of the model is the natural logarithm of real consumption per adult equivalent, the estimated coefficients measure the percentage change in real consumption per AE for a unit change in the independent variable. When the explanatory variable is dummy, the percentage change in dependent variable from a unit change in dummy variable is approximately e^g - 1, where g is the coefficient of the dummy variable. Among the 17 variables considered in the model, 11 variables were found to have a statistically significant impact in determining the consumption and hence poverty status of households at less than 10% probability level. Hence, interpretation of the effect of significant and plausible explanatory variables follows.

The result shows that family size in AE has negative impact on consumption and found to be significant at less than 1% probability level. The level of household consumption per AE decrease as household size increases and hence the chance of falling under poverty line increases. The coefficient (-0.134) indicates the marginal effect which implies that decreasing household size by one unit, ceteris paribus, will increase consumption per AE by 13.4% and hence improves the poverty status of the household. This output clearly shows the importance of decreasing fertility rate. The more probable solution is improving access of the poor to education and information on family planning methods.

The coefficient of age of household head is positive and significant (P<0.1). This implies that an increase in age of household head increases consumption per AE and the likelihood for the household to become non-poor. This is possible because older farmers have better experience in farming, accumulated wealth and use better planning than the younger ones. Hence, they have better chance of escaping poverty. Keeping other factors constant, consumption level increases by 0.6% as age of the household head increases by one year.

Highest education level attained is significant (P<0.01) and has a positive relationship with household's welfare. The coefficient, 0.037, shows that, holding other factors constant, harnessing education level by one year will increase consumption level by 3.7%. The plausible explanation is that better educated individuals are more active in accepting new technologies as educated persons have better capacity to manage own resources, credit received, and can allocate and use them properly.

The model result also reveals that size of land cultivated has a significant (P<0.01) and positive influence on consumption per adult equivalent. The effect of landholding size on consumption per adult equivalent is relatively very large (0.81) and thus can reduce the risk of being poor significantly. This is because of the fact that the size of landholding is a surrogate for a host of factors including wealth, access to credit, and capacity to bear risk. Larger farms are associated with greater wealth and availability of capital which increases the probability of investment in purchase of farm inputs that increase food production. The estimated coefficient for size of land cultivated by the household implies that, other things kept constant, increasing land size by one hectare per AE will increase consumption per AE by nearly 81%.

Table 4: Determinants of consumption expenditure per adult equivalent

Description of model variables	*Coefficient values*	*Robust std. err.*	*t-values*	*P-value*
Constant	6.507	0.215	30.281	0.000***
Sex of household head	0.044	0.049	0.883	0.379
Family size in AE	-0.134	0.024	-5.707	0.000***
Age of household head in years	0.006	0.003	1.947	0.054*
Dependency ratio	-0.001	0.027	-0.037	0.971
Highest education grade completed in years	0.037	0.011	3.320	0.001***
Size of land cultivated per AE (ha)	0.807	0.247	3.263	0.001***
Number of crops cultivated by household	0.039	0.017	2.213	0.029**
Livestock holding in TLU/AE	0.340 *	0.124	2.743	0.007**
Herd diversification	-0.045	0.026	-1.745	0.084*
Ln amount of credit received (Br)	0.018	0.006	2.901	0.004***
Frequency of extension visit per month	-0.044	0.022	-1.979	0.050**
Ln of agricultural income per AE (Br)	0.044	0.019	2.288	0.024**
Distance from main market center in hour	0.0227	0.022	1.209	0.220
Ln of non-farm income per AE (Br)	0.007	0.010	0.695	0.489
Number of sick individuals in the year	0.038	0.019	1.981	0.050**
Use of manure	0.036	0.069	0.524	0.601
Average distance from basic service in hour	0.059	0.037	1.595	0.113
Number of observations = 140				
Stand. error of estimate= 0.2267				
F(17,122) = 15.40				0.00***
Adjusted R- squared = 0.638				
Durbin Watson = 2.388				

***,**,* indicates significance level of variables at less than 1, 5 and 10% respectively.

Crop diversification positively and significantly affects consumption expenditure per AE (P<0.05) and thus affects poverty status negatively. The coefficient (0.039) indicates that keeping the influence of other factors constant, the consumption level of households will increase by 3.9% as the ability to diversify to different crop increases by one unit. Thus those households that grow relatively large number of crops tend to be non-poor than those that grow less.

Livestock holding correlated positively with well-being ($P<0.01$) and has relatively higher impact. Those households having higher TLU per AE are at less risk to become poor. The marginal effect of livestock is 34% in consumption gain. That is, given other variables held constant, the consumption level increases by 34% as household accumulates one more TLU per AE. Thus the likelihood of households being poor diminishes significantly. Therefore households who received livestock credit own relatively higher livestock holding than non-recipients and thus they were relatively better in welfare gain. Results also indicate that, in the study area, what matters is the size of livestock holding and not the diversity in the type of livestock probably because different types of livestock require different type of management and rearing practices and thus may impose high work burden on household members.

The amount of credit received is positively correlated with the dependent variable and significant ($P<0.01$). The coefficient, 0.018, indicates that keeping the influence of other factors constant, consumption level increases by 1.8% when amount of credit received increases by 1%. Thus households that received credit had better chance to be non-poor. Credit can create capacity to purchase agricultural inputs and livestock to fatten and resale and thus increase household income which in turn helps to purchase food and non-food items during shocks and in normal time. Moreover, credit will help households to accumulate asset. Moreover, agricultural income has positive correlation with consumption and is statistically significant ($P<0.05$). Increase in agricultural income leads to a higher level of consumption per AE, with a 1% increase in agricultural income being associated with 4.4% increase in consumption per adult equivalent. Availability of higher agricultural income improves the welfare status of the households and in turn enables them to invest on livestock, access to education, and the likes, and then reduces poverty.

Simulation on Predicted Consumption Expenditure

Before running any simulation it is important to predict consumption expenditure of each household using appropriate model that contains variables strongly related with consumption expenditure. Accordingly, the reference (base simulation) results of mean consumption per AE as measured in real terms, poverty head count, poverty gap and poverty severity indices were found to be Birr 1257.83, 37.7%, 6.13% and 1.37% using the coefficients of significant explanatory variables. Table 5 presents the effects of the change in certain selected variables on consumption per AE and the poverty indices as compared to the base simulation values. The simulations analysis assumed that the considered changes in the explanatory variables do not affect the model parameters or other exogenous variables. While this is a plausible assumption for incremental changes, it warrants a more cautious interpretation for simulations that involve “large” policy changes. Moreover, when examining the simulations, it is worthwhile to keep in mind the sign and magnitude of the regression coefficients; the proportion of the population affected by the simulation; and the size of the considered change in the variable (Datt et al. 2000).

One result that is common to most simulations is that the percentage change in squared poverty gap index is generally greater than the percentage change in poverty gap index, and the percentage change in poverty gap index is in turn generally larger than the percentage change in headcount index (Mulat et al. 2003). However, the simulation results of this study show some inconsistency with the above hypothesis. That is, in all simulations except simulation 8 the percentage changes of squared poverty gap were higher than that of percentage changes of poverty gap index. But percentage changes in poverty head count index were larger than percentage changes in poverty gap index in most of the simulations. This may be attributed to the large number of poor households who are slightly below the poverty line initially might escape the poverty line as a result of the simulated change in these variables.

Simulation 1 examined the effect of reducing family size to mean value for those households having greater than this value. This simulation affects 41% of sample households. Simulated results showed that this have the effect of increasing the mean consumption expenditure per AE by 1.1% and, reduces headcount, poverty gap and squared poverty gap indexes by 35%, 22% and 23%, respectively. The slight increase in consumption attributed to the reduction of family size resulted in very high percent reduction in all three poverty indexes.

In simulation 2, the effect of increasing educational level by 4 grades was analyzed. This includes all sampled households having education level of grade 8 and below. This simulation had the effect of increasing the mean consumption per AE by 2% and which in turn contributed to reduce the poverty head count, poverty gap and squared poverty gap indexes by 36%, 35% and 52%, respectively.

Table 5: Mean percentage change in consumption and poverty indexes after simulation

Description of simulated change in selected explanatory variables	*% change in real con. expenditure per AE*	*% change in poverty headcount index*	*% change in poverty gap index*	*% change in squared poverty gap index*
1. Reduce family size to mean value for household above mean	1.10	-35.17	-21.88	-23.32
2. Increase education level by 4 grade level	2.10	-36.17	-35.10	-52.14
3. Increase land holding by 0.5 ha	1.60	-21.88	-23.57	-38.51
4. Increase livestock holding by one TLU for all households	0.60	-8.24	-8.87	-15.76
5. Increase livestock holding by 2 TLU for all households	1.10	-15.84	-17.06	-28.89
6. Provide credit for all non-users equivalent to the average of the users	0.50	-11.66	-8.94	-20.17
7. Double the amount of credit provided only for credit users	1.00	-16.14	-15.28	-8.55
8. Increase agricultural income by 20%	0.10	-2.22	-2.05	-3.95

Simulation 3 examined increase in the cultivated land area per household by 0.5 hectare. This simulation resulted in a rise of household consumption per AE by 1.6%. The headcount poverty, poverty gap and squared poverty gap indexes declined by 22%, 24% and 39%, respectively. Simulations 4 and 5 examined the relationship between consumption, poverty and ownership of livestock as measured in TLU. Thus simulation 4 and 5 are concerned with increase in livestock holding by one and two TLU for all households respectively. These simulations resulted in a rise of household consumption per AE by 0.6% and 1.1%, respectively. Accordingly, the headcount poverty, poverty gap and squared poverty gap index declined by 8%, 9% and 16% for simulation 4 and by 16%, 17% and 29% for simulation 5, respectively.

The effect of providing credit for all non-credit users equivalent to the average amount to users and doubling the amount of credit initially provided only for credit users were analyzed in simulations 6 and 7, respectively. Simulation 6 has an impact of increasing mean consumption per AE by 0.5% while simulation 7 increases by 1.0%. The poverty measures, poverty head count, poverty gap and squared poverty gap declined by 12%, 9% and 20% in simulation 6 and by 16%, 15% and 9% in simulation 7, respectively. The effect of increasing agricultural income by 20% for all households on mean consumption and poverty was examined (simulation 8). Results depicted that the impact was very small (due to magnitude of the coefficient), this change can only increase consumption per AE by 0.1% and had reduced poverty head count, poverty gap and squared poverty gap indexes by only 2%, 2% and 4%, respectively.

CONCLUSION

Based on analysis of primary data gathered form household survey, the impact of livestock based rural credit intervention and other socio-economic variables on household welfare (measured in consumption expenditure) and in the reduction of poverty level have been studied. The simulated model scrutinized the effect of change on statistically significant variables on consumption expenditure and poverty level.

Cost of basic needs approach of poverty line determination was used to construct district specific poverty line and was found to be Birr 1039 per AE per annum at December 2006 constant price. The poverty indexes were calculated using household consumption expenditure figures derived from the estimated model. Accordingly the study has revealed an overall head count, poverty gap and severity index of 0.38, 0.06 and 0.014, respectively. The study confirmed the profound role of livestock credit in reducing poverty and increasing household consumption expenditure. Based on the empirical findings, it would be important to conclude that livestock credit have profound and far-reaching socioeconomic impacts on the lives of rural people in the study areas. Thus, in order to reduce poverty strengthening the household asset base through improved credit access for best and locally appropriate income generating activities~~y~~ like livestock fattening need to be prioritized.

NOTES

1 *Belg* is small rainy (cropping) season and it extends from months of March to May.

2 *Meher* is long and main rainy (cropping) season and it extends from month of mid-June to September.

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