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Impact of Microcredit on Household Consumption and Assets in Nepal

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ABSTRACT

This paper intends to assess the impact of microcredit on Household Consumption and Assets in Nepal. The multivariate techniques used to achieve the objectives of the study. The study uses Nepal Living Standard Survey 2011 data, which covers 5,988 households. Considering the endogeneity in the microcredit participation of household, the study uses instrumental variable technique (IV method) for assessing the impact of microcredit on Household Consumption and Assets. After the adjustment of the endogeneity, distance of bank, distance of cooperative from household and holding of land size of household as the instruments, eligible household reduced 475 household from 779 total households of intervention group and similarly 2,953 households from 5,209 total households of control group. CMP (conditional mixed process) estimator used to give flexibility in terms of combining continuous and binary variables together in the same model. Multivariate analysis indicates that it has positive and significant relationship on household consumption and on assets, (household consumption is on Food Consumption, Non-Food Consumption and Total Consumption. And similarly, household assets are, on ownership of livestock such as buffaloes, cows, sheep, etc, Ownership on transportation such as Cycle or Motor cycle, Ownership on appliances, such as Refrigerator, Television, CD player) on intervention group than the control group. The result and finding and review of the literatures in this paper provided a wide range of evidence that microcredit programs can increase incomes and uplift families out of poverty. Microcredit would be a viable and potentially sustainable tool to reduce poverty in Nepal.

1. Introduction

A loan for the poor used to be an absurd concept. Millions of poor, vulnerable non-poor and unbanked households want financial services. They seek a diverse range of services including loans, savings, insurance, and facilities for sending and receiving remittances. Households use financial services to build incomes, mitigate risk, and protect against vulnerability often

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exacerbated by economic crises, illness, and natural disaster. They invest in micro and small businesses, purchase assets, improve their homes, and access health and education services (Pokhrel,2017).

It is often argued that the financial sector in low-income countries has failed to serve the poor. With respect to the formal sector, banks and other financial institutions generally require significant collateral, prefer high income and high loan clients, and have lengthy and bureaucratic application procedures. With respect to informal sector, money-lenders usually charge excessively high interest rates, tend to undervalue collateral, and often allow racist attitudes to guide lending decisions. The failure of formal and informal financial sectors to provide affordable credit to the poor is often viewed as one of the main factors that reinforce the vicious circle of economic, social and demographic structures that ultimately cause illiteracy and poverty (Pokhrel,2017).

As the partial response of this failure, over the past three and half decades, there has been significant growth in what can be termed "micro-credit". Microcredit is essentially the dispersion of small collateral-free loans to jointly groups in order to foster income generation and overall poverty reduction through enhancing self-employment (Pokhrel,2017)

Perhaps the best-known micro-credit institution is the pioneering *Grameen Bikas Bank* in Nepal which was the model of *Grameen Bank* of Bangladesh. However, the Grameen model has been replicated in many countries (even in high income countries such as the United States), and one estimates that over 10 million households world-wide are serviced by microcredit (Morduch,1997).

Time to time, the World Bank, USAID and other international donor agencies arrange an international summit on microcredit. At that summit, representatives of international donor agencies and microcredit organizations have set a target to achieve. Under these circumstances, it is important to evaluate what is the real impact of poor through poverty alleviation capacity of microcredit? We need to know that whether claims, made by the international microcredit summit and the microfinance institutions in Nepal to eradicate poverty and improve people's poverty related indicators through microcredit, are rhetoric or reality. For that some studies have carried out and found that access to this type of credit by the poor has a positive, large and permanent effect on living standard while other studies have also found that through micro-credit, the poor households simply become poorer through the additional burden of further debt (Chowdhury, 2005).

We therefore need to know the answer to a number of questions before making any statement on the microcredit summit's and microfinance institutions' target. Does microcredit increase the school expenditure of borrowing households through increasing their income? Does microcredit increase the educational level of their children of borrowing households? Does microcredit increase the number of currently school going children of borrowing households? Is it true that microcredit programs are sustainable tool to reduce illiteracy in Nepal?

Keeping with this in mind, this study is intended to examine empirically the impact of microcredit on household consumption and assets in Nepal. The cross-sectional data from Nepal Living Standard Survey III (2011) has used in this study which covers 5,988 households. Among them 5,209 households are control and 779 households are intervention group. The drawback associated with impact assessment studies using one period cross sectional data is that the result of such studies does get biased due to the problem of self-selection and endogeneity. The presence of such an endogeneity problem, the study uses instrumental variable technique (IV method) for assessing the impact of microcredit on household consumption and assets.

2. Hypotheses of Research

The main hypothesis of this study is that microcredit is a sustainable tool to reduce poverty of borrowing households. The poor households in rural areas fail to acquire the minimum amount of capital that is required to improve the employment status of the members of the households due to lack of collateral. Microfinance institutions provide poor households with this minimum capital to improve their employment status. Through improving employment status poor households increase their income and thus, improve the fulfillment of basic needs. Gradually these households graduate to increase in household consumption is on food consumption, non-food consumption and total consumption. And able to make their life by increasing their household assets. So, microcredit will be a sustainable tool to reduce poverty.

Within this main hypothesis, two sub hypotheses can be defined:

- The membership in the microcredit institutions improves the employment opportunity and increases income of the poor households;
- The membership in the microcredit institution improves the fulfillment of basic needs of the poor households, i.e. membership of the microcredit institutions increases the access to financial services which ultimately increase self-employment and lead to increase the household consumption and assets (household consumption is on food consumption, non-food consumption and total consumption. similarly, household assets is on ownership of livestock such as buffaloes, cows, sheep, goats, hens, horses, and donkeys, ownership of transportation such as Cycle or Motor cycle or Tractor or Trolley or Cart, Ownership of appliances, such as Refrigerator or Television or CD player or Washing Machine or Sewing Machine or Cell-Phone or Others).

3. Literature Review

In spite of the existence of microcredit for over thirty-three years, it is surprising that there is a shortage of literature, which provides clear evidence of alleviation of poverty indicators capacity of microcredit. Only a few impact assessment studies have been conducted with carefully chosen treatment and control groups and these studies provides a mixed picture of the impact (Morduch, 1999).

The results of the empirical evidence on impact of microcredit on poverty's indicators such as employment, income, assets, formal education health access, sanitation etc. have found very mixed results (Hossain, 1984), (Proshika, 1995), Mustafa, et.al (1996), Sebstad and Chen (1996), Khandker and Chowdhury (1996), Pitt and Khandker (1996), Bruntrup et.al (1997), Edgecomb and Barton (1998), (Morduch, 1999), Schrieder and Sharma (1999).

Glewwe and Jacoby (1995) tested the effect of child health and nutrition outcomes in Ghana, including the age of enrollment and years of completed schooling. They used the cross-sectional data to identify effects. One of the approaches in that study was to seek instruments that affect child health characteristic (such as height for age anthropometric outcome) but were not correlated with unobserved family characteristic affecting child education. They proposed as instruments for child health (a) Distance to the closest medical facility and (b) Maternal height. Both justifiably correlate with child health, but they also pointed out the mother's height could affect her labor productivity and hence household income and the resulting time she has to spend on her children's education. Distance to nearby medical facilities could also correlate with other community characteristic, such as presence of school. Both of the caveats weaken the assumption that cov(Z, e) =0. From the IV estimate, as well as alternative estimate specifying fixed effect for families. They found strong negative effects of child health on delayed enrollment but no statistically significant effect on completed years

of schooling.

Ghalib (2009) explained the social impact on lives of the poor by means of a standard model. This is sort of an experimental design which consists of a control group and a treatment group. Treatment group is exposed to microfinance intervention whereas control group is not, assuming that both the groups are living in the identical economic and social conditions. The difference in the quality of lives, in terms of social indicators is considered the impact of microfinance. Since social impact is a complex process and a number of other factors will contribute to the model.

Some impact evaluation studies have found that access to credit by the poor has a positive, large and permanent effect on poverty's indicators such as employment, income, assets, formal education health access, and sanitation. However, other studies have found that poverty is not reduced through micro-credit, poor households simply become poorer through the additional burden of further debt. Since more money for micro-credit essentially means less money for other programs with similar aims. Bruntrup et.al (1997), have only used descriptive statistics for impact analysis. They have not used any multivariate technique to determine the impact of microcredit on poverty related aspects of borrowing households. Mustafa et.al;(1996) and Hossain (1984) completed their study without solving endogeneity problems. It means they were biased in selecting the sample households. Among the studies reviewed, Khandker and Chowdhury (1996), and Pitt and Khandker (1996) were found sound in methodological perspective. Hossain (1998), Khandker and Chowdhury (1996), have conducted the study using cross sectional data and only one impact assessment study, Khandker (2005), has conducted using a panel data set. Instrumental variable technique (IV) method (Stock & Watson, 1998) allows for endogeneity in the individual participation, program placement, or both and it also can allow for time-varying selection bias. Measurement error that results in attenuation bias can also be resolved through this procedure. This approach involves finding a variable (or instrument) that is highly correlated with program or participation but that is not correlated with unobserved characteristics that affecting outcomes.

(Megumi & Abhay, 2021) explained about the microcredit group-lending program and estimates how and the extent to which post-determined group-related factors reflecting the group atmosphere and rivalry among the group members affect the economic achievements of the loan users. Based on data from Maharashtra State, India, the study found that social homogeneity and monitoring among members worked as building blocks to increase the household income of a loan user, while fairness and frequent meetings with other members work as stumbling.

(Samer ali, Abdullah, & Nurulizwa, 2021) Investigated Al-Amal Bank's microcredit impacts on women empowerment in Yemen, one of the poorest Middle Eastern nations. A panel dataset and primary and secondary data were gathered through household surveys and propensity score matching to restrict intangible variables 'possible effects and the empirical results revealed that microcredit had a significant positive effect on monthly household incomes and accumulated asset values. Although microcredit facilitated female entrepreneurship and income generation for improved household incomes and expenditure, no influence was found on female household decisions and mobility following the patriarchal system practiced in many Arabian nations, including Yemen. They found that theoretically and practically contributed to the body of knowledge in three ways. First, a novel proof of how microcredit interactions affected several Yemeni women empowerment elements was identified. Second, provides new insight into the empowerment theory by explaining how access to microcredit influences numerous features of women's economic and social

empowerment. Lastly, social and family traditions significantly influenced female attributes and lifestyles by reflecting how communal and family rituals affected microcredit impacts on women empowerment and vice versa.

(Mohammad Monzur, Khanam, & Nghiem, 2019), investigated the impact of microcredit programs on child schooling in rural Bangladesh using cross-sectional data from 439 households across 20 villages of four districts of the country. A child's school outcomes were measured by school enrolment, school attendance and grade attainment (measured by the right grade for age). The results of that study revealed that the participation in microcredit programs had a significant positive effect on school attendance but no effect on either school enrolment or grade attainment. They suggested that care should be taken in assessing the effectiveness of microcredit programs.

(Pham Tien, Katsuhiro, & and Pham, 2019) evaluated the macro and micro, impact of microcredit on rural household economy, particularly on output value and net income of rural households, using Matched Difference-in-Difference method; on economic growth, especially the aggregate effect of production increase and income growth, using Input–Output analysis. The results at micro level found that microcredit benefits self-employment rather than other economic activities of households. The salient results from the macro-economic analysis revealed that, not as expected, the effect of microcredit on output increase is not so large. They suggested to Vietnamese government that microcredit is an effective development strategy at both micro and macro levels and recommended to enact the relevant policies to enhance the effectiveness and outreach of microcredit.

(Nigusu & Asfaw, 2019) the impact assessment of microfinance conducted both at household and institutional outreach and sustainability based on average income, access to education, access to medical facilities, nutritional status, savings, employment generation and empowerment and found that if outreach of above variables expanded a positive impact. Major socioeconomic variables that affect credit repayment include education, age of household head, family size, gender of household head, farm size, loan size, livestock ownership, annual farm revenue, loan diversion, frequency of contact with development agent, group effect and location of borrowers from lending institution.

4. Methodology

4.1. Source of Data

The data used in this research are taken from Nepal Living Standard Survey (NLSS). The original survey was carried out by the Central Bureau of Statistics (CBS), National Planning Commission, and Government of Nepal. The NLSS has been carrying out since 1995/96. The second time the NLSS was carried out in 2003/04. And the NLSS 2010/11 was the third round of the survey conducted by the CBS. NLSS followed the globally adopted framework and methodology developed by the World Bank. All the three surveys followed the Living Standard Measurement Survey Methodology, which was developed by the World Bank. While the panel data could be desirable to inter temporal changes and specially studying on impact. This study used the cross-section data of NLSS III in view of unavailability of panel data. This cross-section survey NLSS III enumerated 7,020 households, of which 5,988 households have been for the cross-section sample and remaining 1,032 were for the panel sample. (CBS, 2012).

Data for expenditure has been generated from the different chapter of the NLSS (III). The data of the consumable goods and occasions are taken from the five and six chapter. Data for

household assets has been generated from the six and thirteen chapter of the NLSS (III). Livestock data have been taken (Buffaloes, Cows, Sheep, Goats, Hens, Horses, and Donkeys) from 13.66. Similarly, Transportation (Cycle, Motor cycle, Tractor, Trolley, Cart) and Appliances (Refrigerator, Television, CD player, Washing Machine, Sewing Machine, Cell-Phone, Others) are taken from chapter 6.05 of the NLSS (III).

4.2. Research Framework

On the basis of discussion made so far and theoretical underpinnings explained in the review of literature, the model has been developed like as shown in the Figure 1 which is a unified framework that sheds light on the impact of microcredit on education at household level. In addition to this demographic and other independent variable has been added in the model.

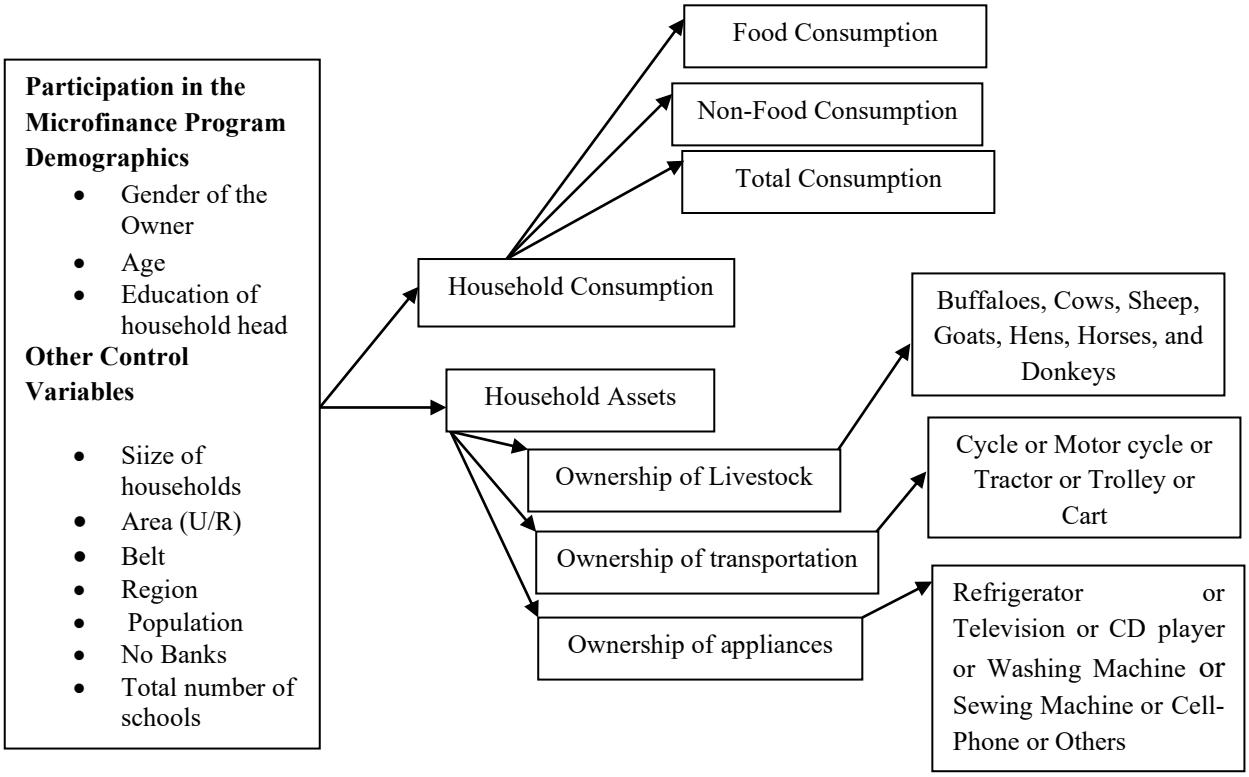

Figure 1. Research Framework
Source: Developed by the researcher.

4.3. Dependent and Independent Variables

Treatment (independent) variables and the outcome (dependent) variables have been considered in the study. Several outcome variables taken into consideration, namely: children education (number of schools going children, highest educational level and school expenditure). There are three possible treatment variables that can be used to assess the impact of microfinance. These are: (1) number of years the clients spent as an access of the microfinance, (2) amount/value of loans availed, (3) number of loan cycles. Treatment variable 1 and 2 are deemed better in representing program availability (Coleman, 1999). Present study has taken (2) as the treatment variable to assess the impact of microfinance. Outstanding loan without collator from agricultural development bank or from commercial bank or from rural development bank or from other financial institution or from NGO or from relief agency or from co-operative has been considered the proxy of microcredit.

4.4. Other Control Variables

Other control variables have been included in the control function such as sex, age, education, household size, type of area (rural, urban), ecological belts (mountain, hills, terai), development region (eastern, central, western and mid and far western), population, number of banks and total number of schools.

4.5. Theoretical Statement of IV Model and Assumptions

Sometimes, problems occur in the regression model. This is often due to omitted variables, or due to errors in variables or due to simultaneous causality which make the error term correlated with the regressor. Omitted variable can be addressed directly by including the variable in a multiple regression, but there is feasible if data is available on the omitted variable. And sometimes, when causality runs both from X to Y and from Y to X, there is simultaneous causality bias, multiple regression cannot eliminate the bias. If a direct solution to these problems is either infeasible or unavailable, then a new method is required. In such situation Instrumental Variables (IV) regression is a general way to obtain a consistent estimator of the unknown coefficients of the population regression function when the regressor, X is correlated with the error term u. The variation in X as having two parts: one part that, for whatever reason, is correlated with u, and the other part that is uncorrelated with u. if we had the information that allowed us to isolate the part second, then we could focus on those variation in X that are uncorrelated with u and disregard the variation in X that bias the OLS estimates. The information about the movements in X that are uncorrelated with u is gleaned from one or more additional variables, is an instrumental variables or instrument.

4.6. General Instrumental Variables Regression Model

$$Y_i = B_0 + B_1 X_{1i} + \ldots + B_k X_{ki} + B_{k+1} W_{1i} + \ldots B_{k+r} W_{ri} + u_i \quad (1)$$

$i = 1, \ldots n$

where,

Y_i is the dependent variable,

$B_0, B_1, \ldots, B_{k+r}$ are the unknown regression coefficients,

$X_{1i}, \ldots, X_k$ are k endogenous regressors, which are potentially correlated with u_i

$W_{1i}, \ldots, W_{ri}$ are r included exogenous regressors, which are uncorrelated with u_i or are control variables,

u_i is the error term which represents measurement of error and /or omitted factors, and

$Z_{1i}, \ldots, Z_{mi}$ are the m instrumental variables.

4.7. Two Stage Least Squares

The TSLS estimator in the general IV regression model in Equation (1) with multiple instrumental variables is computed in two stages:

(1) First-stage regression(s): Regress X_{1i} on the instrumental variables ($Z_{1i, \ldots,} Z_{mi}$) and the induced exogenous variables ($W_{1i, \ldots,} W_{ri}$) using OLS. Compute the predicted values from this regression; call these $X_{1i\ hat}$. Repeat this for all the endogenous regressors X_{2i}, ..., X_{ki} thereby computing the predicated values $X_{2i\ hat, \ldots,} X_{ki\ hat}$

(2) Second-stage regression: Regress Y_i on predicted values of the endogenous variables ($X_{1i\ hat,}$ ..., $X_{ki\ hat}$) and the included exogenous variables ($W_{1i,\ ...,}$ W_{ri}) using OLS. The TSLS estimators, B_{0hat}^{TSLS}, ..., $B_{k+r\ hat}^{TSLS}$ are the estimators of the second –stage regression.

In this study two stages are done automatically within TSLS estimation commands in STATA software.

4.8. Two Conditions for Valid Instrument

A set of m instruments Z_{1i}, ..., Z_{mi} must satisfy the following two conditions to be valid:

(1) Instrument Relevance

- In general, let $X_{1i\ hat}$ is the predicted value of X_{1i} from the population regression of X_{1i} the instruments (z's) and the included exogenous regressor (W's) and let "1" denote a regressor that takes on the value "1" for all observations (its coefficient is the intercept), then ($X_{1i\ hat,}$ ..., $X_{ki\ hat,}$ W_{1i}, ..., $W_{ri,\ 1}$) are not perfect by multicollinear.
- If there is only one X, then at least one Z must enter the population regression of X on Z's and the W's.

(2) Instrument Exogeneity

The instruments are uncorrelated with the error term, that is

$Corr(Z_{1i,}\ u_i)= 0$, ..., $(Z_{mi,}u_i)=0$.

4.9. The Instrument Variable Assumptions

The variables and error in the IV regression model satisfy.

(1) $E(u_i/\ W_{1i,}$ ...,$W_{ri})=0$

(2) (X_{2i}, ..., X_{ki}, W_{1i}, ..., W_{ri}, Z_{1i}, ..., Z_{mi}, Y_i) are i.i.d. draws from their joint distribution.

(3) The X's, W's, Z's and u all have nonzero, finite fourth moments

(4) The W's are not perfectly multicollinear and

(5) The two conditions for the valid instrument hold.

4.10. A Rule of Thumb for Checking for Weak Instruments for Relevancy

The first stage F-statistics is the F-statistics testing the hypothesis that the coefficients on the instruments, Z_{1i}, ...,Z_{mi} equal to zero in the first stage of the two stage least squares. When there is single endogenous regressor, first-stage F less than 10 indicates that the instruments are weak. In which case, the TSLS estimator is biased (even large sample), and TSLS t-statistics and confidence interval are unreliable (Stock and Watson, 1998).

4.11. Empirical Instrumental Variables Regression Model

4.11.1. First Stage

Micro = $\alpha + \beta_1$sex + $\beta_2$age + $\beta_3$education + $\beta_4$size of households + β_5 area +β_6 belts + β_7 development regions + β_8 population +β_9 no of banks+ β_{10} total number of school + β_{11}distance of bank + β_{12} distance of cooperative + β_{13} holding of land + u_i (2)

4.11.2. Second Stage

$$Y = \alpha + \lambda_1 \text{sex} + \lambda_2 \text{age} + \lambda_3 \text{education} + \lambda_4 \text{size of households} + \lambda_5 \text{ area} + \lambda_6 \text{ belts} + \lambda_7 \text{ development regions} + \lambda_8 \text{ population} + \lambda_9 \text{ no of banks} + \lambda_{10} \text{ total number of school} + \lambda_{11} \text{micro}^{hat} + vi \quad (3)$$

Y is the dependent or outcome (Household Consumption and Assets)

Micro is the endogenous regressor, which is potentially correlated with u_i whose characteristic is the participation of microfinance which is measuring the household status (a binary variable having a value 1 if there is participating in the credit and 0 otherwise)

Sex, age, education, household size, type of area (rural, urban) belts (mountain, hills, terai) development region (eastern, central, western and mid and far western), population, no of Banks and total number of school are included exogenous regressor, which are uncorrelated with ui or Control variables. Ui is the error term which represents measurement of error and /or omitted factors. Distance of bank, distance of cooperative and holding of land size are the instrumental variables which are is highly correlated with program or participation but that is not correlated with unobserved characteristics that affecting outcomes. β_1, ..., β_{13} are the unknown regression coefficients.

4.12. Mandatory Diagnostic Tests of Models for IV

Two important tests, testing for endogenneity and testing of over identifying restrictions have been carrying out for searching the plausible instruments for a potentially endogenous explanatory variable. As a diagnostic test conducted on all given 3 equations for the test of the strength of instruments and over identification restrictions. Cragg-Donald Wald F statistic, Sargan statistic (over-identification test of all instruments), and under identification test (Anderson canon. corr. LM statistic), have been tested and results of all six models are verified (Table1)

When the distance of the cooperative is used as IV for outcome variables in all 3 equations, the criteria of testing the over identifying restriction. Distance of cooperative from the household, over identification test is satisfied. When distance of bank and land holding (eligibility restriction criteria to the participant of households for microcredit) are added to the IVs list, nR^2 is higher than the 10 percent level which is statistically verified. Therefore, it is valid to add these two variables as instruments to the IV list.

Testing for endogeneity, OLS and 2SLS estimator have been estimated in the study. As it is seen, there is statistically significant difference between OLS and 2SLS. As Hausman (1978) suggested directly comparing the OLS and 2SLS estimates and determining whether the difference is statistically significant or not for all 3 equations, both OLS and 2SLS are found consistent because all variables are exogenous. If OLS and 2SLS statistically significant, it concludes that dependent (outcome) variable must be endogenous. For details, (Number of observations, Result of F-test, Probability > F, R-Squared and Adjusted R-squared) see in Appendix.

Table 1.
Diagnostic test Results

Dependent Variable (outcome variable)	Exogenous variables	Endogenous variables	Instruments	Weak identification test (Cragg-Donald Wald F statistic)	Sargan statistic (over identification test of all instruments)	Under identification test (Anderson canon. corr. LM statistic):
nonfood_7	age, sex, edu(education) (size of household), type of area (rural and urban), Region (eastern, central, western Midwestern and far western), population, numbers of schools, numbers of bank and financial institutions	Micro	Distance of Bank, Distance of cooperative and size of land holding	13.92	1.93	41.55
totcons_7				13.92	63.23	41.55
livestock (cown bufn goatn sheepn horn henn)				13.92	111.93	41.55
transportation (cycle Motercycle car)				13.92	19.44	41.55
Appliances (radio ref wash televi phone sew com)				13.92	89.67	41.55
					40.86	41.55

Table 1 shows the all individual results of tests on all dependent variables.

Weak identification test (Cragg-Donald Wald F statistic): > 10

Sargan statistic (over identification test of all instruments): ≤ 10% of level

Chi-sq(2) P-val ≤ 10% of level

For the results of OLS and IV estimator of all six models (Appendix)

5. Emperical Results and Discussion

To assess the impact of microcredit on consumption and assets of participants, controlling for selected demographic and other variables. An instrumental variable technique with CMP command was run to determine the effect of microcredit on consumption and assets. The key coefficients of all the variables estimated household consumption i.e.,food consumption (exp_food), non-food consumption (nonfood) and total consumption(totalcons) and household assets i.e. ownership of livestock, ownership of transportation and ownership of home appliances. The coefficients of all the estimated model of IV estimator are summarized in Table 2 and in Table 3.

5.1. Impact of Microcredit on Consumption

Based on the iv estimator's results in Table 2 show that expenditure on food (exp_food) variable is positive and highly significant with participation of microcredit. It shows that the participant household are more likely to spend on their food consumption with respect to non-participant households. So, there is no evidence of rejection of the hypothesis Participation in the microcredit leads to increase total household expenditure in food items (food consumption).

Table 2.
IV results indicators of household consumption (exp_food, nonfood, and totcons)

Variable	exp_food	nonfood_7	totcons_7
Age	22.93***	1149.08***	1581.64***
Sex	17.44	-28615.86***	-30882.11***
Edu	78.45***	8321.97***	10815.93***
Hhsize	400.89***	13361.82***	25130.05***
Urban	499.28***	59696.53***	73332.67***
Hill	374.78**	7875.62	7698.00
Terai	149.81	32172.03**	37667.32**
Edr	620.06***	15592.80*	39211.98***
Cdr	890.42***	42682.67***	70709.27***
Wdr	790.93***	22416.80***	44980.38***
Mwdr	68.98	15875.65*	27365.12**
Population	0.00	-.09***	-.12***
Noofbank	13.54***	700.68***	904.16***
totalnoofs~l	-1.31***	22.91	24.96
micro	3014.97***	-107240.48***	-111059.45***
cons	-599.00**	-84879.99***	-96140.69***

legend: * p<0.05; ** p<0.01; *** p<0.001
Source: Author's calculation based on instrumental variable technique estimator.

The variable non-food (nonfood_7) has a negative and highly significant with participant of the microfinance. This reflected that household those who is not participated in the microcredit is more likely to spend on nonfood with negative sign. So, there is no evidence of acceptance of the hypothesis participation in the microcredit leads to decrease the nonfood items (nonfood consumption). The total consumption (totcons_7) is negative and highly significant with participation of microcredit. It shows that the participant household are more unlikely to spend on their total consumption with respect to non-participant households. The amount of non-food expenses is in the total expenses influence the total household expenditure of household which made the negative result of total consumption. So, there is no evidence of acceptance of the hypothesis Participation in the microfinance leads to increase household expenditure (consumption).

These results are supported by some previous studies like, Effa and Herring 2005; Alexander and Karlan, 2006 and Noreen U, 2010. However, Morduch (1998), argued that eligible households that participated in the microfinance have strikingly less consumption level than eligible household living in the same are without participation in the microfinance. Same result has been observed in this study for H4ab.

5.2. Impact of Microcredit on Assets

Household assets consist of one-dimension ownership, which is comprised of three categories is ownership of livestock, transportation and appliances. The hypotheses were developed to measure the impact of microcredit on assets were that participation in the microcredit leads to increase the ownership of livestock (Buffaloes, Cows, Sheep, Goats, Hens, Horses, and Donkeys) as a household asset, led to increase the ownership of transportation (Cycle or Motor cycle or Tractor or Trolley or Cart) and leads to increase the ownership of appliances (Refrigerator or Television or CD player or Washing Machine or Sewing Machine or Cell-Phone or Others) as a household asset.

To assess the impact of microfinance on ownership of household assets of participants, controlling for selected demographic and other variables, and an instrumental variable

regression estimator with cmp estimator was run to determine the effect of microfinance ownership of household assets. The key coefficients of the estimated model of IV estimator are summarized in Table 3.

Based on the results in Table 3 show that ownership of livestock (Buffaloes, Cows, Sheep, Goats, Hens, Horses, and Donkeys) as a household asset is positively associated with the participation of microcredit. It led to more ownership of livestock as compared to non-participant of microcredit. So, there is no evidence of rejection of the hypothesis participation in the program leads to increase the ownership of livestock as a household asset.

Table 3.
IV results indicators of Household assets (livestock, transporta~n and appliances)

Variable	**livestock**	**transporta~n**	**appliances**
Age	.00907914***	.00154881	.0044959**
Sex	.03867899	.11145297*	-.37322299***
Edu	-.03444658***	.06414221***	.10649359***
Hhsize	.13151061***	.12498885***	.09225813***
Urban	-1.1410635***	.38532948***	.797144***
Hill	.00421917	.87146747***	.0653098
Terai	-.17676137	2.9784928***	.6980666***
Edr	.04159695	.31570271***	.47270023***
Cdr	-.55330549***	.48803745***	.64742554***
Wdr	-.52654603***	.49215935***	.78235418***
Mwdr	-.19019319	-.10624876	.03761554
Population	-2.734e-07	-8.606e-07**	-1.141e-06***
Noofbank	-.01456811***	.00643633***	.00764987***
totalnoofs~l	.00090826***	.00013058	.0005218**
micro	.0676377	.51671024***	.38002344*
_cons	.41087284*	-3.453432***	-1.2882093***

legend: * p<0.05; ** p<0.01; *** p<0.001

Based on the results, the ownership of transportation (Cycle, Motor cycle, Tractor, Trolley Cart) as a household asset is positively associated with the participation of microcredit and which is highly significant. So, there is more likely to have ownership of transportation as compared to non-participant of microfinance. Theoretically, it can be said that participant household might start a new kind of business and they may need to buy Cycle or Motor cycle or Tractor or Trolley or Cart after taking microcredit. This theoretical concept is supported with this result. The ownership of appliances (Refrigerator or Television or CD player or Washing Machine or Sewing Machine or Cell-Phone or Others) as a household asset is positively associated with the participation of microcredit and which is highly significant. So, there is more likely to have ownership of appliances as compared to non-participant of microcredit. Based on the interpretation of all results, there is no evidence of rejection of the hypothesis participation in the microcredit leads to increase the ownership of appliances (Refrigerator or Television or CD player or Washing Machine or Sewing Machine or Cell-Phone or Others) as a household asset.

These results are supported by some previous studies with Kondo (2007); Sebstad, J. and Chen, G. (1996) Sengsourivong (2006) and Setboonsarng and Parpiev 2008. However, Kondo et al (2008) and Noreen (2010), are found contradict with this result.

6. Conclusion

Does microcredit work? This study and review of the literature in this paper provided a wide range of evidence that microcredit programs can increase incomes and lift families out of poverty.

In conclusion to this study, it is argued that there is a role for microcredit as a poverty reduction policy tool. However, it is emphasized that if microcredit is chosen as an intervention policy to enhance the illiteracy reduction there is need to set clear objectives for the indicators of economic empowerment for the people. More importantly the ability of households to begin informal sole micro entrepreneurships should not be assumed to be adequate for the improvement of household income. There is need to create a policy framework to spur growth in the enterprises as well as the rural economy as a whole through the creation of employment opportunities and an increment in the agricultural output to achieve such illiteracy reduction objective policy intervention may be required. In essence this calls for both private (microcredit) and public partnerships to create the environment where such a quality education objective could be realized. Further impact study should be done on expenditure, housing quality and food security in the same model presented here to perceive the impact of other indicators of poverty.

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(Appendix)

OUTPUT OF IV ESTIMATORS

Impact on Household Consumtion

1 cmp (exp_food = age sex edu hhsize urban hill terai edr cdr wdr mwdr population noofbank totalnoofschool micro) (micro =dist_ban k dist_coop land_hec_tot age sex edu hhsize urban hill terai edr cdr wdr mwdr population noofbank totalnoofschool), indicators ($cmp_cont $cmp_probit)

Mixed-process regression

Number of obs = 5988

LR chi2(32) = 2481.12

Log likelihood = -55660.148 Prob > chi2 = 0.0000

exp_food	Coef	Std. Err	z	P>|z|	[95% Conf. Interval]	
age	22.9382	2.284168	10.04	0	18.46131	27.41508
sex	17.44877	75.69067	0.23	0.818	-130.9022	165.7998
edu	78.45252	6.898559	11.37	0	64.93159	91.97345
hhsize	400.8886	13.81828	29.01	0	373.8052	427.9719
urban	499.2819	74.85101	6.67	0	352.5766	645.9871
hill	374.7829	131.6408	2.85	0.004	116.7716	632.7942
terai	149.8199	208.6356	0.72	0.473	-259.0985	558.7382
edr	620.0646	123.859	5.01	0	377.3054	862.8239
cdr	890.42	120.2189	7.41	0	654.7953	1126.045
wdr	790.9395	127.9263	6.18	0	540.2086	1041.67
mwdr	68.97702	133.8186	0.52	0.606	-193.3027	331.2567
population	.000042	.0004257	0.10	0.921	-.0007924	.0008763
noofbank	13.5392	2.579874	5.25	0	8.482742	18.59566
totalnoof	-1.31022	.2450347	-5.35	0	-1.790479	-.829961
micro	3014.967	69.63966	43.29	0	2878.475	3151.458
_cons	-599.001	222.8822	-2.69	.007	-1035.842	-162.1598

micro	Coef	Std. Err	z	P>|z|	[95% Conf. Interval]	
dist_bank	-.0056545	.0013035	-4.34	**0**	-.0082092	-.0030997
dist_coop|	-.0038318	.0016443	-2.33	0.020	-.0070546	-.0006091
land_hec_tot	.0386874	.0195498	1.98	0.048	.0003706	.0770043
age	-.0076177	.0014686	-5.19	.000	-.010496	-.0047394
sex	.0416116	.047867	0.87	0.385	-.0522059	.1354291
edu	-.0061135	.0045129	-1.35	0.176	-.0149587	.0027316
hhsize	-.0346299	.0084513	-4.10	0.000	-.0511941	-.0180656
urban	-.1481861	.0484372	-3.06	0.002	-.2431212	-.0532509
hill	-.2205241	.0785491	-2.81	0.005	-.3744775	-.0665707
terai	-.0992911	.1241673	-0.80	0.424	-.3426546	.1440724
edr	.0119308	.0736327	0.16	0.871	-.1323866	.1562482
cdr	-.1471166	.0727222	-2.02	0.043	-.2896495	-.0045836
wdr	-.2242232	.0773823	-2.90	0.004	-.3758897	-.0725568
mwdr	.2002511	.0776613	2.58	0.010	.0480376	.3524645
population	-2.95e-07	2.56e-07	-1.15	0.248	-7.97e-07	2.06e-07
noofbank	-.005349	.0015628	-3.42	0.001	-.0084121	-.0022859
totalnoofs	.0007158	.0001509	4.74	0	.0004201	.0010114
_cons	-.3415095	.1426128	-2.39	0.017	-.6210254	-.0619936
lnsig_1	7.753078	.0101213	766.02	0	7.733241	7.772916
atanhrho_12	-1.548326	.0339761	-45.57	0	-1.614918	-1.481734
sig_1	2328.73	23.56975			2282.989	2375.387
rho_12	-.9135088	.0056231			-.9238834	-.9017923

2 cmp (nonfood_7 = age sex edu hhsize urban hill terai edr cdr wdr mwdr population noofbank totalnoofschool micro) (micro =dist_bank dist_coop land_hec_tot age sex edu hhsize urban hill terai edr cdr wdr mwdr population noofbank totalnoofschool), indicators ($cmp_cont $cmp_probit)

Mixed-process regression

Number of obs = 5988

LR chi2(32) = 1984.14

Log likelihood = -4375.4423 Prob > chi2 = 0.0000

nonfood_7	**Coef**	**Std. Err**	**z**	**P>|z|**	**[95% Conf. Interval]**	
age	1149.082	120.2837	9.55	0	913.3301	1384.834
sex	-28615.86	3976.585	-7.20	0	-36409.82	-20821.9
edu	8321.977	362.5074	22.96	0	7611.476	9032.479
hhsize	13361.83	726.253	18.40	0	11938.4	14785.26
urban	59696.54	3932.331	15.18	0	51989.31	67403.77
hill	7875.627	6921.525	1.14	0.255	-5690.313	21441.57
terai	32172.03	10962.13	2.93	0.003	10686.65	53657.41
edr	15592.8	6510.917	2.39	0.017	2831.64	28353.97
cdr	42682.67	6317.675	6.76	0	30300.25	55065.08
wdr	22416.8	6722.183	3.33	0.001	9241.566	35592.04
mwdr	15875.65	7047.704	2.25	0.024	2062.408	29688.9
population	-.092257	.0223842	-4.12	0	-.1361293	-.0483848
noofbank	700.6792	135.7046	5.16	0	434.703	966.6554
totalnoof	22.90565	12.94441	1.77	0.077	-2.464934	48.27622
micro	-107240.5	6599.414	-16.25	0	-120175.1	-94305.86
_cons	-84879.99	11717.82	-7.24	0	-107846.5	-61913.47

micro	**Coef**	**Std. Err**	**z**	**P>|z|**	**[95% Conf. Interval]**	
dist_bank	-.0028713	.0018008	-1.59	0.111	-.0064008	.0006583
dist_coop|	-.0069737	.0026031	-2.68	0.007	-.0120757	-.0018718
land_hec_tot	-.154682	.0363064	-4.26	0	-.2258412	-.0835228
age	-.0021486	.0018259 -	-1.18	0.239	-.0057274	.0014302
sex	-.0584967	.0562427	-1.04	0.298	-.1687304	.0517369
edu	.0159808	.0054939	2.91	0.004	.005213	.0267485
hhsize	.0451169	.0107393	4.20	0.000	.0240682	.0661655
urban	-.0255418	.0598641	-0.43	0.670	-.1428734	.0917897
hill	-.3150727	.0917039	-3.44	0.001	-.4948091	-.1353364
terai	-.0935278	.1465342	-0.64	0.523	-.3807296	.193674
edr	.1291718	.0859742	1.50	0.133	-.0393345	.2976782
cdr	.0243266	.08593	0.28	0.777	-.144093	.1927462
wdr	-.1159787	.0917699	-1.26	0.206	-.2958444	.063887
mwdr	.3454345	.0890241	3.88	0	.1709506	.5199185
population	-5.04e-07	3.00e-07	-1.68	0.093	-1.09e-06	8.44e-08
noofbank	-.0078611	.0019149	-4.11	0	-.0116141	-.004108
totalnoofs	.0009923	.000177	5.61	0	.0006454	.0013393
_cons	-1.236611	.1679619	-7.36	0	-1.56581	-.907412
lnsig_1	11.71457	.0104587	1120.07	0	11.69407	11.73506
atanhrho_12	.6850145	.0386042	17.74	0	.6093517	.7606772
sig_1	122340.8	1279.532			119858.5	124874.6
rho_12	.5947696	.0249479			.5436706	.6414757

Impact on Household Assets

3 cmp (livestock = age sex edu hhsize urban hill terai edr cdr wdr mwdr population noofbank totalnoofschool micro) (micro =dist_ban k dist_coop land_hec_tot age sex edu hhsize urban hill terai edr cdr wdr mwdr population noofbank totalnoofschool), indicators ($cmp_probit $cmp_probit)

Mixed-process regression

Number of obs = 5988

LR chi2(32) = 3335.61

Log likelihood = -3839.9681 Prob > chi2 = 0.0000

livestock	Coef	Std. Err	z	P>|z|	[95% Conf.	Interval]
age	.0090791	.0016631	5.46	0.000	.0058196	.0123387
sex	.038679	.0531961	0.73	0.467	-.0655835	.1429414
edu	-.0344466	.0047716	-7.22	0	-.0437987	-.0250945
hhsize	.1315106	.0108397	12.13	0	.1102652	.152756
urban	-1.141064	.046447	-24.57	0	-1.232098	-1.050029
hill	.0042192	.0998469	0.04	0.966	-.1914771	.1999154
terai	-.1767614	.1448509	-1.22	0.222	-.4606638	.1071411
edr	.041597	.0945762	0.44	0.660	-.143769	.2269629
cdr	-.5533055	.0888851	-6.22	0	-.7275171	-.3790938
wdr	-.526546	.0940486	-5.60	0	-.7108778	-.3422143
mwdr	-.1901932	.10233	-1.86	0.063	-.3907562	.0103699
population	-2.73e-07	2.81e-07	-0.97	0.330	-8.23e-07	2.77e-07
noofbank	-.0145681	.0017461	-8.34	0	-.0179904	-.0111459
totalnoof	.0009083	.0001696	5.35	0	.0005758	.0012407
micro	-.0676377	.1371506	-0.49	0.622	-.336448	.2011726
_cons	.4108728	.163829	2.51	0.012	.0897739	.7319718

micro	Coef	Std. Err	z	P>|z|	[95% Conf.	Interval]
dist_bank	-.0076801	.0021336	-3.86	**0**	-.0124979	-.004084
dist_coop|	-.0122934	.0030762	-4.00	**0**	-.018174	-.0062121
land_hec_tot	-.1590347	.0425484	-3.05	**0**	-.2048468	-.0444862
age	-.0057695	.0019745	-3.21	0.003	-.0101256	-.0024437
sex	.0038861	.0607904	0.09	0.949	-.1131239	.1244178
edu	.0115227	.0059396	1.77	0.052	-.0011482	.0221404
hhsize	.0230945	.0113472	1.85	0.042	-.001228	.0428586
urban	-.1578929	.0650329	-2.49	0.015	-.2880701	-.0342437
hill	-.3507404	.0986003	-3.72	**0**	-.5609091	-.1738022
terai	-.1559665	.1559126	-1.09	0.317	-.4776273	.1355024
edr	.0836817	.0911766	0.84	0.359	-.1020774	.255847
cdr	-.0225327	.0912549	-0.36	0.805	-.2119959	.1466896
wdr	-.2214588	.0972705	-2.41	0.023	-.4263226	-.0439204
mwdr	.3869945	.0939041	4.13	0.000	.2036937	.5720431
population	-4.91e-07	3.19e-07	-1.51	0.124	-1.11e-06	1.43e-07
noofbank	-.0058222	.0020007	-2.92	0.004	-.0097536	-.0019165
totalnoofs	.0009448	.0001894	5.13	**0**	.0005961	.0013341
_cons	-.9181536	.1823267	-4.86	**0**	-1.240863	-.5273744
atanhrho_12	.1781355	.0875814	-2.96	0.042	-.4266672	-.0868303
rho_12	.1762749	.08486			-.4025322	-.0866128