

The Impact of Microfinance on Consumption in Bangladesh

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Abstract

Given that Bangladesh is the birth place of microfinance, the number of MFIs as well as their members and borrowers increased dramatically in the last 40 years. Empirical studies provide evidence that microcredit borrowers experience higher consumption, better lives and lower poverty through more income-generating activities. The current paper estimates the impact of microfinance on consumption in Bangladesh. It explores the specific effects of microcredit on food and nonfood consumption. The data used is generated from Household Income and Expenditure Survey (HIES) 2010 conducted by Bangladesh Bureau of Statistics (BBS). The paper finds that microcredit borrowing increases consumption. Microcredit borrowers have been estimated to have 121 Taka higher weekly food consumption and 34 Taka higher nonfood consumption than non-borrowers.

Keywords: microfinance/microcredit, consumption, poverty, Bangladesh

1. Introduction

Microcredit is believed to have been pioneered by Muhammad Yunus in Bangladesh. He emphasized that poor women had no access to formal financial services due to their lack of collateral and that they were considered to be high credit risk borrowers. Muhammad Yunus then exempted collateral and replaced group lending, where credit was extended based on a group liability arrangement. Members took the loans individually but the repayment was a joint responsibility by the group. Grameen Bank is one of the first formal microfinance institutions; since its foundation in the mid-1970s, its membership had grown to one million by 1991, 2.4 million by 2002 and 6.9 million in 2006 (United Nations 2008).

Since its inception, microcredit has developed as an economic development method to help low-income people in Bangladesh which has one of the longest histories with microcredit. In Bangladesh, microcredit has continuously improved while Grameen Bank and BRAC – the largest NGO in the world – carried out a number of experiments as well as pilot programs. Currently Bangladesh has a large number of renowned microfinance institutions (MFIs) including Grameen Bank, BRAC and the Association of Social Advancement (ASA).

Microfinance has gained an extensive praise in assisting the poor, particularly women, through increased incomes, self-employment and empowerment. Microfinance in Bangladesh has especially raised self-respect by empowering borrowers and improving their social standing and participation in activities like building community roads, running health programs and community schools (Kaburi *et al.* 2013).

In 2008 the number of microcredit borrowers in Bangladesh was approximately 57 million. However that number proliferated to 73.5 million in two years. Around 16.5 million borrowers joined the microcredit sector between 2008 and 2010. In 2010, 42 percent of the total borrowers took loans for trade and communication sector while 32 percent of the total loans were financed in the agriculture sector (Credit Development Forum and Institute of Microfinance 2010).

Most of the previous studies show that microcredit generally helps the poor by raising consumption, income, and empowering women borrowers. Imai and Azam (2012) find that microcredit raises income and consumption of borrowers. In addition Schroeder (2014) finds that microcredit loans have a positive and significant impact on consumption. Likewise Khandker and Samad (2013); Mazumder and Wencong (2013) uncover that microcredit has positive impact on poverty alleviation. United Nations (2008) secretary general report states that there is a remarkable contribution of microcredit to alleviating the conditions of over 100 million people living in poverty worldwide and the need to broaden the institutional capacity, focus and approach of microfinance institutions is significant.

Microfinance is the provision of credit in small amounts to very poor people, often with no collateral requirement. The literature provides evidence that microfinance has a positive effect on human welfare particularly reducing poverty (Khandker & Samad 2013; Mazumder & Wencong 2013). This study aims to find out the impact of microfinance on consumption in Bangladesh. It specifically aims to investigate the effect of microfinance on food consumption as well as nonfood consumption.

The rest of the paper is organized as follows: Section one focuses on introduction. Section two discusses the relevant literature briefly. Section three describes econometric methods for the paper, while section four describes data. Section five explains results, and finally, section six concludes the paper.

2. Literature Review

Microfinance programs extend small loans to very poor people for income generating self-employment projects

(Grameen Bank 2014). These projects enable them to care for themselves as well as their families. Being a substitute for informal credit and requiring no collateral is considered as the main feature which differentiates MFIs from other commercial institutions. The MFI loans have simple procedures and less documentation. Moreover they are always group lending with easy and flexible repayment schemes. The most deprived parts of the population are always targeted (State Bank of Pakistan 2013).

Although economic growth is regarded as one of the contributing factors for poverty reduction, there are policies more specifically focused on alleviating poverty, such as those aimed at reducing income inequality. Government plans to replace traditional money lenders in extending credit for the poor have had only limited achievement since even public agencies require collateral which in turn excludes people with few assets from this privilege. Some credit programs, mainly microcredit offer training and technical assistance for the urban poor, particularly women, in microenterprises – very small firms (Nafziger 2006).

Imai and Azam (2012) In order to examine whether loans from microfinance institutions reduce poverty in Bangladesh, use and analyze four-round panel survey (conducted in 1997-98, 1998-99, 1999-2000 and 2004-05) carried out by Bangladesh Institute of Development Studies (BIDS). Estimating both fixed effects and difference-in-difference and propensity score matching models, the study shows that even 100 percent increase of net change of total loan raises household income per capita by 0.51 percent to 0.54 percent on average *ceteris paribus*. However, 100 percent increase of net change of productive loan (loans for productive activities like agriculture) raises household income per capita by 0.69 percent to 1.09 percent on average *ceteris paribus*. Imai and Azam (2012) also find that MFI's general loan has a significant and positive impact on food consumption. A 100 percent increase in net change of total loan raises household food consumption per capita by 0.52 percent to 1.02 percent on average *ceteris paribus*. On the other hand, 100 percent increase of net change of nonproductive loan (loans for nonproductive activities like marriage) increases household food consumption per capita by 0.74 percent to 1.11 percent on average *ceteris paribus*. The paper concludes that loans provided by microfinance institutions have a significant effect on reducing poverty particularly income poverty and consumption poverty. It emphasizes that income poverty tends to be alleviated by offering productive loans to households while consumption poverty is likely to be reduced by non-productive loans. The models used seem to be particularly useful according to their results. Likewise paying more attention to consumption and income and categorizing loans into productive and non-productive assisted the researchers to easily find more accurate results.

As a result of improved micro-borrowing over a long period, it is plausible that households enjoy a higher level of income – if income was augmented through activities financed under microcredit programs –, a higher level of consumption – since the participating households were poor to begin with – and consequently, a reduced level of poverty. Using several data sets, Khandker and Samad (2013) investigate whether microcredit programs, which have been operating in rural Bangladesh for over three decades, have any long-term effects in improving household income and expenditure and lowering poverty. Khandker and Samad (2013) find that poverty reduction, particularly the reduction of extreme poverty, due to microcredit intervention can be as high as nine percent of the total poverty reduction over the last ten years in Bangladesh. The study specifically finds poverty outcomes to be higher for continuous participating households than irregular participating households. A very interesting finding from the paper is that during the last two decades, total income, the share of nonfarm income and household consumption grew more for the nonparticipants than for the participants. In contrast, both moderate and extreme poverty rates went down more for participant households compared to nonparticipants.

In critical assessment on whether microfinance is a poverty reduction tool, Chowdhury (2009) attempts to provide a critical appraisal of the debate on the effectiveness of microfinance as a universal poverty reduction tool. The study underlines that the discovery of Grameen-led movements was not lending the poor but rather the concept of group lending as poor have been borrowing from time immemorial. Group lending effectively overcomes the problems of collateral and adverse selection due to information asymmetry through peer monitoring. Impact analysis of microfinance suggests that the majority of the borrowers who already have some assets or business skills and education are more likely to succeed. However there are a number of constraints facing micro-enterprise owners in the informal sector ranging from the incapability to access the formal credit market to marketing their products. Apart from NGOs, the government should be a prominent player in a comprehensive financial sector to cater for the needs of the “missing” middle in the informal and agricultural sectors. This is vital ensuring that growth is employment-intensive to maximize its effect on poverty alleviation (Chowdhury 2009).

Before involvement with credit program, the poor were 86.7 percent and thereafter decreased to 40.0 percent. Accordingly, before involving with microcredit, the non-poor were 13.3 percent of the sample and then increased to 60.0 percent (Mazumder & Wencong 2013). This indicates that poverty prevalence decreased through access to credit. Furthermore, distribution of microcredit respondents along with their change in monthly income implies that before taking loan majority of the responds (63.3 percent) were in low income group, roughly one-fourth of them (26.7 percent) in middle income and the remaining 10 percent in high income groups. After joining the microcredit program, middle income group increased practically (45.6 percent from 26.7

percent) and at the same time low income group decreased considerably (40.0 percent from 63.3 percent). A few respondents (14.4 percent) also improved their income with high amount (Mazumder & Wencong 2013). After taking loan, poverty level of the participants decreased significantly, whereas in respect of control group members, the poverty level remained almost unchanged.

Schroeder (2014) estimates the impact of borrowing from microfinance institutions in Bangladesh on per-capita household consumption. The study finds that microcredit loans have a positive and significant impact on consumption, with elasticity in the range of 0.117 to 0.212. Moreover, on average level, the study predicts that an additional \$100 in lending can be expected to increase per-capita household consumption by around 18 to 20 percent. These findings contribute to the debate over whether microfinance is reducing poverty in Bangladesh by highlighting that microfinance loans are effective in the sense that it allows households to raise their consumption levels.

3. Methods

The objective of the paper is to estimate the impact of micro-credit borrowing on food and non-food consumption. A multiple linear regression model (MLRM) in equation (1) has been used:

$$W_i = \beta_0 + \beta_1 X_i + \beta_2 Y + \varepsilon \quad (1)$$

Where W_i is the outcome variable (namely, food consumption and nonfood consumption), X_i is a vector of variables of socio-economic characteristics of respondents (namely, gender, age, marital status, highest class passed, religion, relationship to head and earner). Y is a dummy variable indicating borrowing status. In our data we have a dummy variable “have you or any member of the household borrowed” and the responses were either yes or no, where borrowed=1 if any member borrowed and 0 otherwise. Finally ε is a white noise error term. According to our discussion, we are comparing the consumption of microcredit borrowers and non-borrowers to see the impact of loans. Therefore we are mainly interested in the coefficient of the dummy variable borrowed in order to observe the consumption difference of the two groups. The borrowing status itself might be affected by some other factors leading to endogeneity issue. Solution to an endogenous regressor problem is overcome using the instrumental variable techniques which require instrumental variables that are highly correlated to the endogenous variable(s) but uncorrelated to the outcome variable of interest (food and non-food consumption here).

A number of econometric methods can be applied for identification of treatment effects and selection bias correction for data. The method of instrumental variables (IV) can be used to solve the problem of endogeneity of one or more explanatory variables (Wooldridge 2013). The aim of using IV methods is to obtain consistent estimators in the presence of omitted variables.

Given the existence of a potential endogenous explanatory variable in the model, estimation of microcredit loan effects on consumption is either under estimated or overestimated (biased and inconsistent estimator). This problem exists if the omitted variables are correlated with our variable borrowed. Consequently borrowed is endogenous variable. Selected instruments for borrowed should be exogenous in equation (1), and correlated with the endogenous variable borrowed. Moreover probit OLS and probit 2SLS have been applied to estimate the effect of microcredit borrowing.

Marginal treatment effects (MTEs) is an approach applied to consider unobserved heterogeneity in treatment effect estimation (Heckman, Urzua & Vytlacil 2006). It estimates treatment effects across the estimated propensity scores. Integrating the estimated MTEs out the observable factors reveals the average treatment effect of the whole sample as well as those on the treated and non-treated. Marginal treatment effects have been estimated for both food consumption and nonfood consumption.

4. Data

This paper uses Household Income and Expenditure Survey (HIES) carried out by Bangladesh Bureau of Statistics (BBS) in 2010. The survey has been completed in one year (1st February, 2010 to 31st January, 2011). This survey includes extensive information on household such as income, expenditure, consumption, savings, housing condition, education, employment, health and sanitation, water supply and electricity, etc.

Explaining the sampling design of the survey BBS stated:

A two stage stratified random sampling technique was followed in drawing sample of HIES 2010 under the framework of Integrated Multipurpose Sample (IMPS) design developed on the basis of the sampling frame based on the Population and Housing Census 2001. The IMPS design consisted of 1000 Primary Sampling Units (PSUs) throughout the country. There were 640 rural and 360 urban PSUs in the sample. The PSU was defined as contiguous two or more enumeration areas (EA) used in Population and Housing Census 2001. Each PSU comprised of around 200 households. In the first stage about one half, 612 is in exact out of total 1000 IMPS PSUs, were drawn. These PSUs were selected from 16 different strata. There were 6

rural, 6 urban and 4 SMA (Statistical Metropolitan Areas) strata. In the second stage, 20 households were selected from each of the rural PSUs and also PSUs located in the municipal areas and SMAs. Thus, the HIES is a sub-set of IMPS.

According to BBS, This period of one year has been divided into 18 terms. In each term a total of 34 PSUs are covered to collect data from a total of 680 sample households. In HIES-2010, 12240 households were selected where 7840 from rural area and 4400 from urban area. The sample size was 362670.

Table 1: Summary statistics

	Borrowers (valid n= 3818)		Non-borrowers (valid n= 7652)	
	Mean	std. Deviation	Mean	std. deviation
Gender	1.52	.500	1.50	.500
Age	1.84	.951	1.80	.939
Marital status	1.59	.624	1.60	.610
Highest class passed	3.08	3.872	3.10	3.902
Religion	1.16	.458	1.15	.461
Borrowed dummy	1.00	.000	.00	.000
Food consumption week 1	1904.63	3385.625	1954.78	3556.306
Food consumption week 2	1865.81	3292.624	1906.88	3402.867
Nonfood consumption	119.16	606.985	126.39	1259.612
Relationship to head	2.82	1.705	2.81	1.666
Earnier	1.72	.447	1.72	0.447

Table 1 shows the summary statistics of the variables used in our equation. Outcome variables are food consumption of week one and two and nonfood consumption. The data on food consumption include cereal, pulses, vegetables, fish, meat, poultry, milk, fruits and others. On the other hand Nonfood consumption includes clothes, footwear, housing/rent, fuel/lighting, household effects and miscellaneous. Borrowed is a dummy variable where microcredit borrowers have the value of 1 while non-borrowers have 0. Moreover all available socio-economic characteristics of respondents are incorporated. Gender comprises (male, female), marital status include (currently married, never married, widowed, divorced, separated), religion is (Islam, Hinduism, Buddhism, Christianity, other), earner is either (yes, no), and relationship to head include (head, husband/wife, son/daughter, spouse of son/daughter, grandchild, father/mother, brother/sister, niece/nephew, father/mother in-law, brother/sister in-law, other relative, specify, servant, employee, other, specify).

5. Results

A multiple linear regression (eq. 1) has been used to estimate the effect of microcredit borrowing on food as well as nonfood consumption using direct OLS method. Tables 2, 3 and 4 capture these effects respectively. Table 5 shows the estimation of food consumption and nonfood consumption using Direct OLS, Direct 2SLS, Probit OLS and Probit 2SLS. Table 6 reports results of endogeneity tests on the instrumented variable borrowed. Marginal Treatment Effects Model is eventually employed and results are demonstrated in Table 7. MTEs results are both parametric and semi parametric polynomial. Figures 1 to 6 also illustrate MTE estimations.

Table2: Effects of Microcredit Borrowing on Food Consumption
 (Dependent variable food consumption week 1; n= 362670)

	Coefficients	Std. Error	P-value
Constant	1862.131	100.266	.000
Gender	8.255	35.279	.815
Age	-4.203	18.007	.815
Marital status	-18.305	27.825	.511
Highest class passed	-8.402	3.667	.022
Borrowed dummy	122.571	58.915	.037
Religion	46.186	37.556	.219
Relationship to head	-21.474	9.840	.029
Earnier	-13.175	43.289	.761

Week one food consumption for borrowers is estimated to be 122.5 Taka higher than non-borrowers (Table 2). Moreover, it has been found that persons with higher level of schooling spend less on consumption than their counterparts with lower level of education.

Table 3: Effects of Microcredit Borrowing on Food Consumption
 (Dependent variable food consumption week 2; n= 362670)

	Coefficients	Std. Error	P-value
Constant	1799.742	94.476	.000
Gender	21.301	33.244	.522
Age	-5.000	16.967	.768
Marital status	-23.674	26.220	.367
Highest class passed	-7.383	3.457	.033
Borrowed dummy	119.561	55.505	.031
Religion	25.856	35.386	.465
Relationship to head	-15.255	9.279	.100
Earnier	-1.791	40.795	.965

In week two the food consumption of respondents seems to be approximately the same. Week two food consumption for borrowers is estimated to be 119.5 Taka higher than non-borrowers (Table 3). It has been found that level of education is a significant predictor of food consumption as it consistently appears to be significant in both models.

Table 4: Effects of Microcredit Borrowing on Nonfood Consumption
 (Dependent variable nonfood consumption; n= 362670)

	Coefficients	Std. Error	P-value
Constant	98.843	16.316	.000
Gender	7.903	5.741	.169
Age	-1.907	2.930	.515
Marital status	-4.748	4.528	.294
Highest class passed	-.028	.597	.963
Borrowed dummy	34.181	9.587	.000
Religion	-6.390	6.111	.296
Relationship to head	.054	1.601	.973
Earnier	-4.344	7.044	.537

Like expenditure on food consumption, nonfood consumption for borrowers is estimated to be Taka higher (34 Taka) than non-borrowers (Table 4). The amount of extra spending by borrowers is less than non-borrowers in case of non-food consumption than food consumption.

Instrumental variable technique has been used because of potential endogeneity in the dummy variable borrowed. The instrumental variables used are: gender, age, marital status, highest class passed, religion, member was abroad more than six months in the last five years, member included of any social safety net programs in the past 12 months, member suffered from any chronic illness/disability in the last 12 months, enterprise solely owned and operated by the household in the past 12 months, total cultivable agricultural land owned, livestock or poultry bird raised by member of the household in the last 12 months, member engaged in any fishing or farm fishing in the past 12 months, member engaged forestry in the past 12 months, assets owned and whether member received remittance inside or outside the country. These instruments are correlated with the variable borrowed but uncorrelated with the outcome variables namely food consumption and nonfood consumption. The coefficient of borrowed may vary due to these instruments. For instance the effect of borrowing is higher if the borrower is female as microcredit borrowers are mainly women.

Table 5: Estimation of food and nonfood consumption

Estimation of week one food consumption				
	Direct OLS	Direct 2SLS	Probit OLS	Probit 2SLS
Borrowed	122.57 (57.0062)	-1685.327 (2202.007)	-1669.208 (2134.777)	-1673.245 (2204.287)
Estimation of week two food consumption				
Borrowed	119.5661 (55.26499)	-1174.066 (2132.721)	-1193.533 (2096.144)	-1196.42 (2132.896)
Estimation of nonfood consumption				
Borrowed	34.18147 (10.08552)	121.9467 (93.77962)	126.8933 (86.94684)	127.2002 (94.29442)

Note: Numbers in parentheses are the standard errors of the estimated food and nonfood consumptions. Robust standard errors have been reported for the control function OLS, Direct 2SLS, Probit 2SLS.

Table 5 compares the estimates of the impact of borrowing on food and non-food consumption using different econometric techniques. Direct OLS estimation shows that borrowers have higher food and nonfood consumption than non-borrowers. In other words microcredit borrowing has positive correlation with both food and nonfood consumption. Results of direct OLS are statistically significant (Tables 2, 3 and 4). However direct 2SLS, Probit OLS and Probit 2SLS show results which are statistically insignificant in both food and nonfood consumption estimations due to the exogeneity of the dummy variable borrowed (see table 6). This implies that results of direct OLS are enough to estimate the effect and there is no need to consider the other results.

Table 6: Tests of endogeneity

Independent variable: week one food consumption				
Durbin (score) chi2(1)	=	0.644775		(p=0.4220)
Wu-Hausman F(1,3133)	=	0.642855		(p=0.4227)
Independent variable: week two food consumption				
Durbin (score) chi2(1)	=	0.289903		(p=0.5903)
Wu-Hausman F(1,3133)	=	0.289008		(p=0.5909)
Independent variable: nonfood consumption				
Durbin (score) chi2(1)	=	1.42983		(p=0.2318)
Wu-Hausman F(1,3133)	=	1.42593		(p=0.2325)

Endogeneity of the instrumented variable borrowed has been tested. Testing the null hypothesis (H_0 : variables are exogenous), we find P-values greater than five percent so there is no evidence to reject it. We therefore conclude that our instrumented variable borrowed is exogenous in all cases.

Table 7: MTE based estimation of food and nonfood consumption

	Parametric MTE	Semi parametric polynomial MTE
Food consumption week 1	-2307.68 (2777.433)	-5631.593 (90030.34)
Food consumption week 2	-2185.9 (1865.384)	-11310.48 (17351.68)
Nonfood consumption	172.9666 (92.16263)	200.6983 (795.6295)

Note: Numbers in parentheses are the bootstrapped standard errors (50 replications).

MTE shows that food and nonfood consumption expenditures are not statistically different between borrowers and non-borrowers because the results are statistically insignificant.

Figure 1: Week 1 Food consumption MTE Estimation (Parametric)

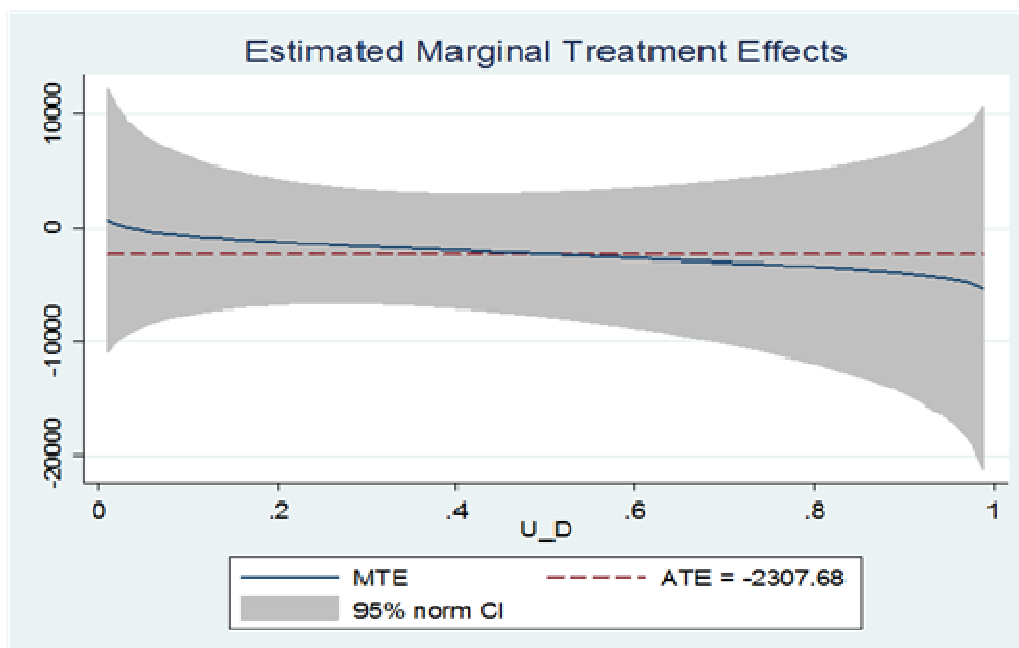


Figure 2: Week 2 Food Consumption MTE Estimation (Parametric)

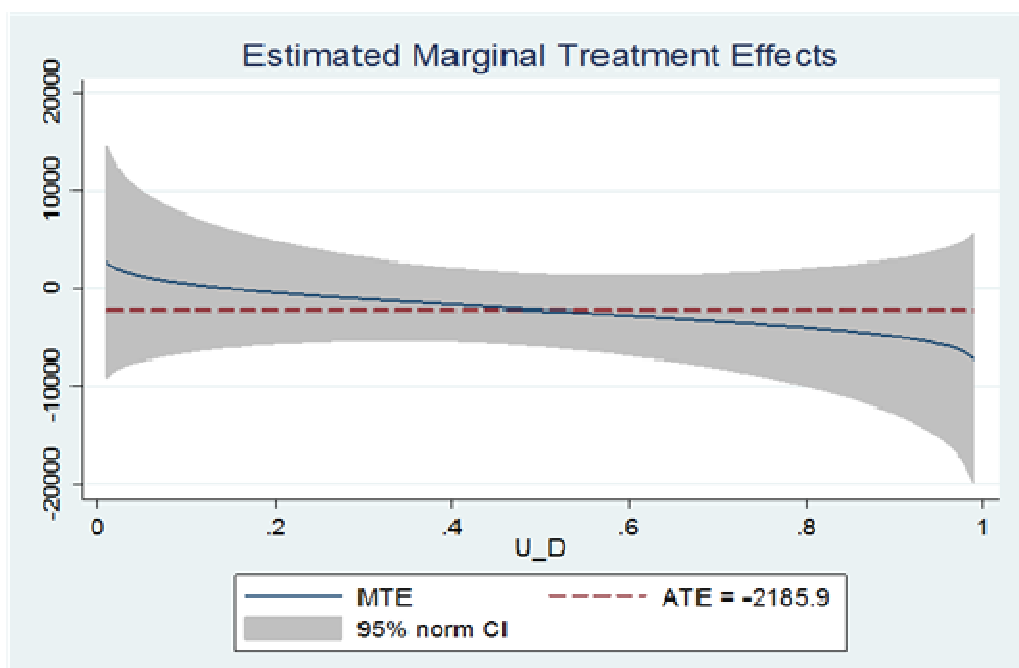


Figure 3: Nonfood Consumption MTE Estimation (Parametric)

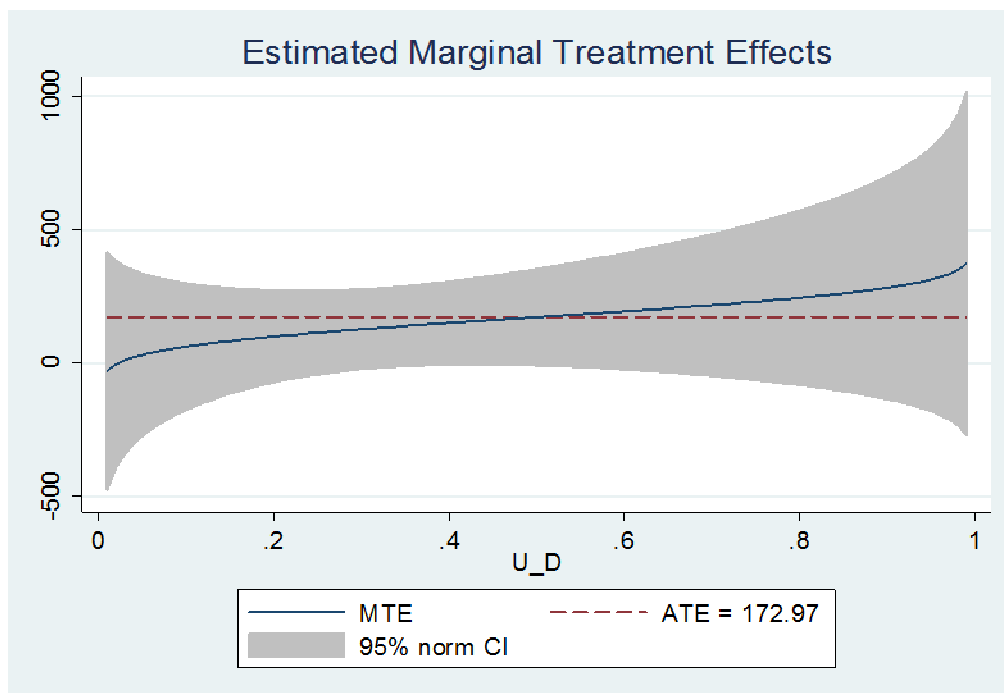


Figure 4: Week 1 Food Consumption MTE Estimation (semi parametric polynomial)

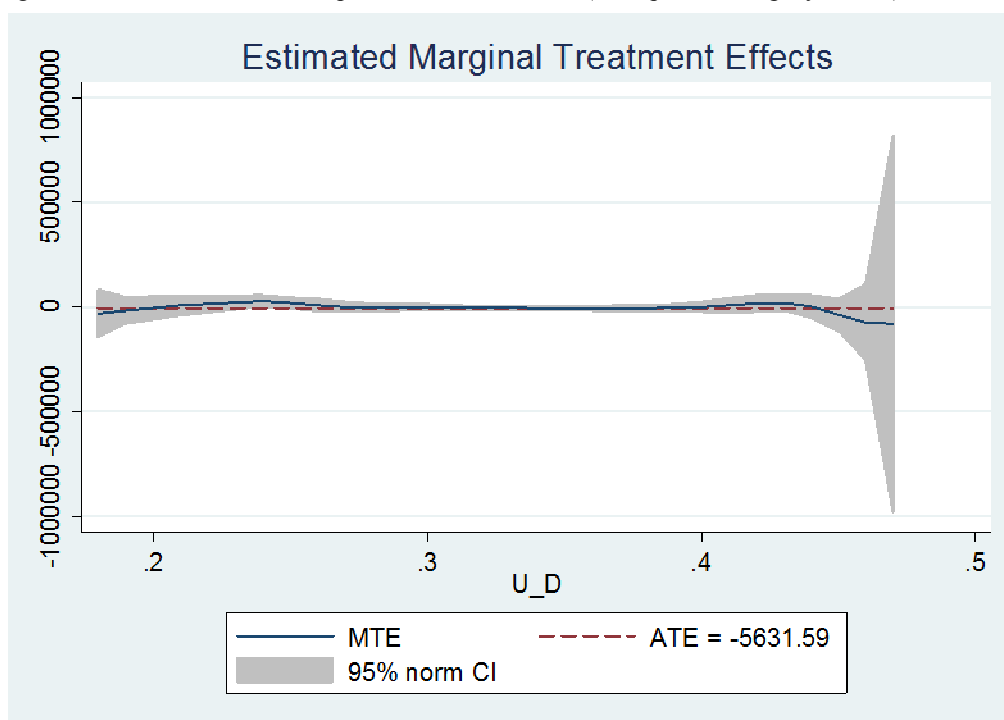


Figure 5: Week 2 Food Consumption MTE Estimation (semi parametric polynomial)

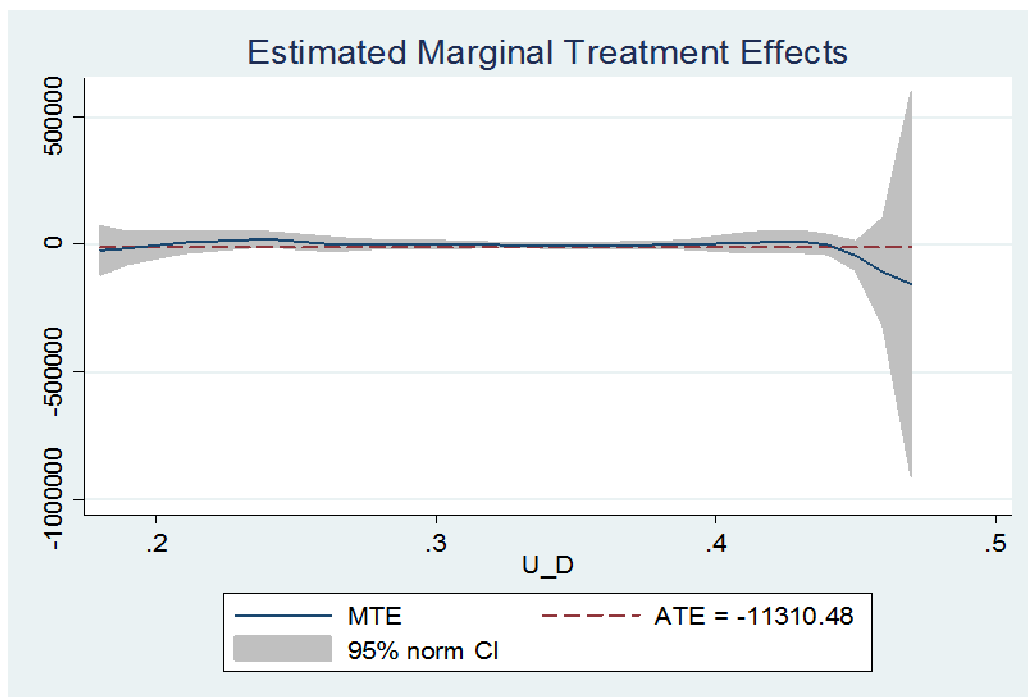
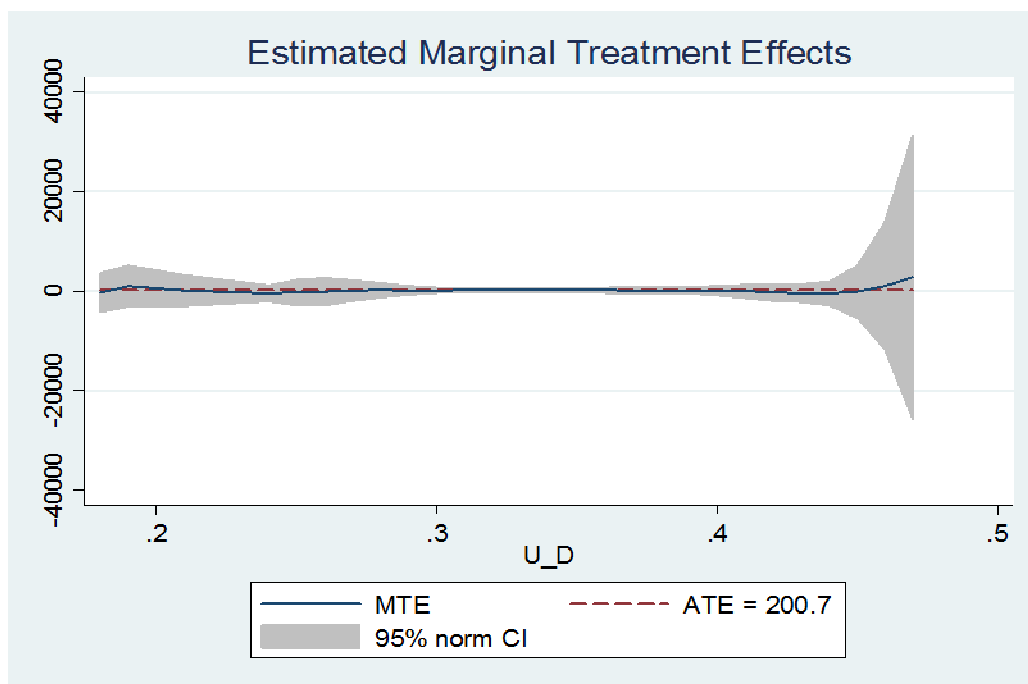


Figure 6: Nonfood Consumption MTE Estimation (semi parametric polynomial)



6. Conclusion

Microfinance is the provision of credit in small amounts to very poor people. What differentiates microfinance institutions from other financial institutions is that there is no collateral requirement, loans are offered to groups, loans have simple procedures and less documentation and that repayment schemes are easy and flexible. In many parts of the world, particularly in Bangladesh – which happens to be the birth place of microfinance – microfinance has gained a wide-ranging applaud in helping the most deprived parts of the population through income generation, self-employment, increasing consumption and empowerment.

This paper examines the impact of microcredit borrowing on consumption in Bangladesh. Findings of the paper support the underlying hypothesis that microfinance increases consumption and in turn reduces poverty. Microfinance institutions provide productive loans for income generating activities as well as unproductive loans

for consumption smoothing. Through comparison, the paper finds that microcredit borrowers have higher consumption than non-borrowers. Furthermore, it has been found that microcredit has a positive effect on consumption of borrowers which in turn influences the standard of living as well as poverty level. In summary, microcredit borrowers have approximately 121 Taka higher weekly food consumption and 34 Taka higher nonfood consumption than non-borrowers. In accordance with the wider debate a number of researches such as Imai & Azam (2012); Khandker & Samad (2013) and Schroeder (2014), similarly figured out that microfinance increases consumption. We therefore conclude that microfinance increases consumption which has a positive impact on poverty reduction and contributes the improvement of livelihood situations.

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