

CONSUMPTION DIFFERENCE BETWEEN MICROCREDIT BORROWERS AND NON-BORROWERS: A BANGLADESH EXPERIENCE

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ABSTRACT

This paper investigates the consumption behaviour of borrowers of two major microcredit institutions in Bangladesh and compares that with non-borrowers. Primary data has been collected from borrowers of the Grameen Bank and Bangladesh Rural Advancement Committee (BRAC) operating in three major districts in Bangladesh. Along with borrowers, non-borrowers data has also been collected from non-program village to avoid endogeneity. Control-group method (non-borrowers from non-program villages) has been used to compare the differences in consumption patterns between the two groups. This study analyses the impact of per capita monthly expenditure and other household characteristics on the budget share of eleven items (food and non-food) consumed by borrowers and non-borrowers. Results from the estimation on linear and quadratic model suggest that borrowers of microcredit programs are better off in terms of consumption than non-borrowers.

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INTRODUCTION

The microcredit program in Bangladesh is a unique innovation of credit delivery technique to enhance income generating activities. Its uniqueness is reflected in its collateral-free group-based lending strategy (Hulme and Mosley, 1996; Yunus, 1999; World Bank, 1994). The program¹ extends small loans to poor people, mainly women, for self-employment activities thus allowing the clients to achieve a better quality of life (Hossain, 1988; Morduch, 2000; Rahman, 1995). It is the most sensational anti-poverty tool for the poorest, especially for women (Micro-credit Summit 1997). Microcredit in Bangladesh has drawn attention of researchers throughout the world because of its distinctive credit delivery system, high recovery rate and its special focus on women. The Grameen Bank - the largest microcredit institution - and the Bangladesh Rural Advancement Committee (BRAC) - the largest non-governmental organisation (NGO) - are the pioneers of microcredit in Bangladesh for almost three decades.

The success of microcredit has captured the interest of many researchers in broad areas such as women's empowerment (Hashemi and Schuler, 1996; Sen, 1997; Goetz and Sengupta, 1996), sustainability and outreach, (Khandker et al., 1995;

McNamara and Morse, 1998; Sharma and Zeller, 1999), group-based lending, (Ghatak, 1999; Stiglitz, 1990; Varian, 1990) and poverty alleviation. Research suggests that access to credit has the potential to reduce poverty significantly (Khandker, 1998). Literature also substantiated the argument that older members' asset valuation and weekly household expenditures are, respectively, 112 percent and 26 percent higher than those of the newer members (Mustafa et al., 1996). Based on the success stories (Hossain, 1988; Hulme et al., 1996; Yaron, 1992; Montgamery et al., 1996; Wahid, 1993; Khandker, 2003) it is assumed that microcredit is improving the standard of living and well-being of the borrowers by improving their level of consumption. In this backdrop, it is worth examining the consumption behaviour of borrowers and also to comparing that with non-borrowers to see if there is any significant difference in the consumption pattern of the two groups.

In this study we investigate the consumption behaviour of borrowers from two major microcredit institutions in Bangladesh and compare that with non-borrowers using the Engel curve analysis as suggested by Leser (1976). The underlying research question for this study is as follows: Are the borrowers of microcredit better off in terms of consumption behaviour compared to non-borrowers? In order to examine this we used primary data from borrowers of the two major institutions and non-borrowers from non-program villages to compare whether there is any significant difference in the consumption patterns between the two groups. In investigating the impact of per capita monthly expenditure and other household characteristics on the budget share of the items consumed by borrowers and non-borrowers we estimated both the linear and quadratic models.

The rest of the paper is structured as follows. Section two provides the background literature. Section three describes the data and its sources. Section four specifies the models and results are discussed in section five. A conclusion is drawn in the final section.

BACKGROUND LITERATURE

Studies on consumption behaviour pioneered by Stone (1953), is performed by estimation of systems of demand equations explicitly derived from the consumer theory. The availability of household survey data from developed countries explains the huge empirical literature that has attempted to estimate systems of demand equations for different consumption categories. The estimation of the consumption-income relationship or Engel relationship from cross-section data has been paid considerable attention in the literature on developed countries. Blundell and Ray (1984) estimated the Engel curve analysis on demand system while Giles and Hampton (1985) studied the same on household expenditure using New Zealand data. Beneito (2003) estimated income elasticity using Engel curve analysis on Spanish economy. Sawtelle (1993) estimated two linear Engel functions for household total expenditure and 15 aggregate classification of consumer durable, non-durable and service expenditures using US cross section data. Using data from the United States, Lee and Brown (1986) examine food expenditure on household data.

Apart from the Engel model, Deaton and Muellbauer (1978) introduced AIDS model (An Almost Ideal Demand System), which has been subsequently adopted by Ray

(1980). However, studies on consumption in the context of developing countries are not overwhelming. In this regard it is worth mentioning the study conducted by Weiskoff (1971), who studied demand elasticity for the developing economy. Meenakshi and Ray (2002) combine the expenditure and demographic information contained in the unit records of nearly 70,000 households to analyse rural poverty in India. Dey (2000) analyse the demand for fish in Bangladesh. Hendriks and Lyne (2003) use panel data on two villages of Africa. Ferdous (1997 and 1999) uses AIDS model on household consumption using secondary data from the Bangladesh Bureau of Statistics.

DATA

The sample is drawn from three major districts of Bangladesh. These are Gazipur, Dinajpur and Chokoria where both the Grameen Bank and BRAC operate. The districts are chosen on the basis of different agro-climatic and socio-economic conditions. From each district five villages are chosen at random. Borrowers are selected in a cluster from each village. To avoid endogeneity non-borrowers' data has been collected from non-program villages. Non-borrowers are selected from non-program villages to share the same socio-economic and cultural background to provide a control group for comparison with borrowers. The samples of borrowers are randomly selected without replacement from the list of households available from the programs' local office of each village. From all three districts together, 387 borrowers and 184 non-borrowers are interviewed through a structured questionnaire. Items consumed by households during a month are broadly classified into food and non-food. All items consumed by the households are classified in eleven broad categories of commodities. The food items are: (1) Cereals (comprising rice and food grains); (2) Pulses (comprising pulses of all types); (3) Vegetables (including fruits); (4) Meat and Fish (comprising chicken, beef, mutton and fish of all types) (5) Milk and Eggs; and (6) Cigarettes, betel-leaves and betel nuts. The non-food items are: (1) Fuel (comprising wood, kerosene and similar products used for cooking); (2) Electricity; (3) Clothing; (4) Education; and (5) Health.

We have deleted 'sugar' from our analysis because the co-efficient of the variable is found to be too small and insignificant. Since primary education is 'free' in rural Bangladesh, money spent on education includes expenses on secondary and tertiary levels, private tutor's fee, books and accessories.

MODEL SPECIFICATION

The following model, as used by Ferdous (1999), shows that the Engel curve analysis is the time series counterpart of Engel function suggested by Leser (1976):

$$B_{ij} = \alpha_i + \beta_i \log X_j + e_{ij} \quad (1)$$

where, B_{ij} and X_j are the budget shares of the i -th commodity for j -th family and total household expenditure respectively and α_i and β_i are the parameters. The model allows $\beta_i < 0$ for necessary, and $\beta_i > 0$ for luxury goods. In the above model the total

expenditure (X_j) may be replaced by per capita total expenditure (x), where $x = X/f$ and f = family size. Then the above model transforms into:

$$B_{ij} = \alpha_i + \beta_i \log x_j + e'_{ij} \quad (2)$$

According to Ferdous (1999), the basic relationship specified by the Engel curve is the relationship between consumption for an individual item and per capita expenditure. In this study we consider total expenditure as a proxy for total income². However, the consumption pattern of any household may be influenced by a large number of socio-economic factors. Many of the socio-economic factors are qualitative in nature and therefore represented by dummy variables. In this study, we consider some of the socio-economic variables such as family size (f), dependency ratio (R) (where R = total number of non-earners ÷ total number of earners) and the age of the borrower or non-borrower (A) under consideration. Thus the model further transforms into:

$$B_{ij} = \alpha_i + \beta_i \log x_j + \delta_i f_j + \phi_i R_j + \tau_i A_j + \varepsilon_{ij} \quad (3)$$

$$\forall_i = 1, 2, \dots, 11$$

Where, ε_{ij} is the random error term.

In many cases, the linear model may not show a good estimation of the parameters. We therefore consider a quadratic model as suggested by Ferdours (1999); Lyssiotou et al. (2002) and Battistin et al. (2003) to see whether these exogenous variables provide any additional information in explaining the budget share of the items consumed by the borrowers and non-borrowers. After adding the quadratic term of per capita household expenditure to equation (3), the model now becomes:

$$B_{ij} = \alpha_i + \beta_i \log x_{ij} + \lambda_i (\log x_j)^2 + \delta_i f_j + \phi_i R_j + \tau_i A_j + \varepsilon_{ij} \quad (4)$$

$$\forall_i = 1, 2, \dots, 11$$

The budget share in equations (3) and (4) are estimated by Ordinary Least Square (OLS) method using all eleven consumable items considered in the study both for borrowers and non-borrowers. Since the objective of this paper is to see if there is a significant difference in the consumption behaviour of borrowers and non-borrowers of microcredit, we introduce a dummy variable called BNB (borrower/non-borrower) in the model. BNB is denoted as 1 for borrowers and zero otherwise. Finally, linear and quadratic models are estimated after adding BNB dummy for the sample as a whole.

Thus the final models are:

$$B_{ij} = \alpha_i + \beta_i \log x_j + \delta_i f_j + \phi_i R_j + \gamma_i BNB_j + \tau_i A_j + \varepsilon_{ij} \quad (5)$$

$$B_{ij} = \alpha_i + \beta_i \log x_j + \lambda_i (\log x_j)^2 + \delta_i f_j + \phi_i R_j + \gamma_i BNB_j + \tau_i A_j + \varepsilon_{ij} \quad (6)$$

RESULTS AND DISCUSSION

Table 1 shows the average consumption of food and non-food items for borrowers and non-borrowers of the three different districts. The table shows that the percentage consumption of basic items such as cereals, pulses and vegetables are higher for non-borrowers than borrowers in all districts. On the other hand, percentage consumption on protein items such as, meat & fishes and milk & eggs are higher for borrowers in all districts. While the percentage consumption on total food items is higher for non-borrowers, it is higher for borrowers for non-food items in all districts except for Chokoria. One interesting finding is that non-borrowers showed higher consumption of cigarettes and betel leaves.

TABLE 1. AVERAGE CONSUMPTION OF BORROWERS AND NON-BORROWERS OF THE THREE DISTRICTS

	Gazipur		Dinajpur		Chokoria		Total	
	Bor	NB	Bor	NB	Bor	NB	Bor	NB
Cereal	835.80 (13.68)	743.02 (16.07)	874.78 (19.91)	919.65 (22.99)	725.59 (15.11)	716.12 (16.93)	812.05 (16.23)	792.93 (18.66)
Pulses	196.74 (3.22)	195.55 (4.23)	191.78 (4.37)	199.53 (4.98)	197.99 (4.12)	190.16 (4.49)	95.50 (3.90)	195.08 (4.57)
Vegetable	559.13 (9.15)	509.77 (11.02)	520.84 (11.85)	503.01 (12.57)	450.00 (9.37)	390.29 (9.23)	510 (10.12)	467.69 (10.94)
Meat & Fish	1317.34 (21.56)	732.35 (15.84)	1003.43 (22.84)	848.65 (21.21)	1166.85 (24.30)	837.04 (19.80)	1162.54 (22.9)	806.01 (18.95)
Milk & Egg	293.81 (4.81)	198.72 (4.29)	174.54 (3.97)	152.47 (3.81)	214.7 (4.47)	209.29 (4.95)	227.68 (4.42)	186.82 (4.35)
Cigarettes and betel leaves	245.40 (4.02)	239.15 (5.17)	130.91 (2.98)	138.25 (3.45)	197.42 (4.11)	173.58 (4.10)	191.24 (3.70)	183.66 (4.24)
Other	550.33 (9.01)	479.64 (10.37)	384.23 (8.79)	369.53 (9.24)	383.1 (7.98)	330.09 (5.52)	439.22 (8.59)	393.08 (8.37)
Total food	3998.56 (65.45)	3098.21 (67.02)	3280.53 (74.69)	3131.12 (78.28)	3335.61 (69.48)	2846.69 (67.33)	3538.23 (69.87)	3025.34 (70.87)
Fuel	175.96 (2.88)	131.54 (2.85)	134.23 (3.05)	111.80 (2.79)	168.61 (3.51)	179.61 (4.24)	159.6 (3.15)	140.98 (3.29)
Electricity	194.74 (3.19)	167.26 (3.61)	63.34 (1.44)	62.69 (1.56)	131.00 (2.72)	117.53 (2.78)	129.69 (2.45)	115.82 (2.65)
Clothing	225.64 (3.69)	129.81 (2.80)	177.40 (4.03)	149.52 (3.78)	181.65 (3.78)	175.67 (4.15)	194.90 (3.83)	151.66 (3.57)
Education	250.74 (4.10)	97.55 (2.11)	92.92 (2.11)	55.55 (1.38)	141.53 (2.95)	99.70 (2.35)	161.73 (3.05)	84.266 (1.95)
Health	247.31 (4.05)	187.79 (4.06)	153.71 (3.50)	131.58 (3.29)	205.62 (4.28)	186.04 (4.40)	202.21 (3.94)	168.47 (3.92)
Other	1016.25 (16.63)	810.28 (17.52)	489.96 (11.15)	357.30 (8.93)	636.61 (13.26)	622.38 (14.72)	714.27 (13.68)	596.65 (13.36)
Total non-food	2110.64 (34.55)	1524.25 (32.98)	1111.57 (25.31)	868.47 (21.72)	1465.03 (30.52)	1380.95 (32.67)	1562.41 (30.12)	1257.89 (29.12)
Total	6109.2 (100)	4622.46 (100)	4392.1 (100)	3999.59 (100)	4800.64 (100)	4227.64 (100)	5100.64 (100)	4283.23 (100)

The figures in the parentheses show the percentage of consumption in terms of total expenditure (in Taka)

The overall result shows that borrowers are better off in terms of the consumption of protein (meat, fishes, milk and eggs) than non-borrowers. The average percentage expenditure on education is also higher for borrowers than non-borrowers. It

is also clear from the data that the total expenditure in terms of Taka (the Bangladeshi currency) is higher for borrowers than non-borrowers.

Results estimated from equations 3 and 4 can be seen from Tables 2 and 3 for borrowers and Tables 4 and 5 for non-borrowers. We have pooled data for borrowers and non-borrowers together and have estimated equations (5) and (6) which are reported in Tables 6 and 7 respectively.

TABLE 2. OLS ESTIMATES OF THE LINEAR MODEL FOR BORROWERS

Items	α_i	β_i	δ_i	ϕ_i	τ_i	R ²
Cereal	0.966* (32.31)	-0.116* (-29.26)	-.007 (-0.592)	-002** (-2.14)	0.003 (1.892)	0.713
Pulses	0.17* (14.38)	-0.018* (-11.76)	-0.003 (-0.69)	-0.002 (-0.47)	-0.0002 (-0.263)	0.287
Vegetables	0.50* (23.35)	-0.053* (-18.72)	-0.004* (-4.73)	-0.001 (-1.29)	-0.0003 (-0.24)	0.483
Meat	-0.15* (-3.26)	0.048* (7.72)	0.007* (3.66)	0.008 (0.40)	0.00003 (0.01)	0.143
Milk	-0.017 (-1.06)	0.009 (4.23)	-0.001*** (-1.77)	0.001*** (1.76)	0.0001 (0.46)	0.064
Cigarettes and betel leaves	0.020 (0.98)	0.003 (1.36)	-0.001 (-1.41)	0.001 (1.27)	-0.001 (-0.82)	0.016
Total food	1.70* (27.33)	-0.143* (-17.32)	-0.003 (-1.41)	-0.001 (-0.67)	0.004 (1.12)	0.461
Fuel	0.134* (9.25)	-0.013* (-7.09)	-0.002* (-4.01)	-0.006 (-1.01)	0.002* (2.35)	0.136
Electricity	0.010 (0.634)	0.002 (1.02)	-0.001* (-2.31)	0.001 (1.39)	0.001 1.34	0.022
Clothing	0.034* (3.41)	0.001 (1.15)	-0.004 (-0.90)	-0.004 (-1.02)	-0.0008 (-1.36)	0.024
Education	-0.180* (-7.78)	0.028* (9.24)	0.001 (1.59)	0.009 (1.01)	0.0003 (0.23)	0.186
Health	-0.017 (-0.93)	0.009* (3.92)	0.0002* (0.02)	0.0004 (0.91)	-0.002* (-2.52)	0.056
Total non- food	-0.70* (-11.33)	0.143* (17.32)	0.003 (1.41)	0.001 (0.67)	-0.004 (-1.12)	0.461

i) Figures within the brackets are the t-statistics.

ii) *, ** and *** indicate significance at 1 percent, 5 percent and 10 percent levels.

The R² values suggest that the model fits better for the items such as cereals, vegetables, total food and total non-food items, which is shown in Tables 2 and 3. In general R² values are quite high for above-mentioned items for both borrowers and non-borrowers. Similar results are obtained when comparing Table 2 with Table 4. Though the difference of consumption expenditure of non-essential³ items (e.g. meat & fishes, milk & eggs, education and clothing) are higher for borrowers, still it cannot be concluded that spending capacity of borrowers has increased due to microcredit intervention alone. In fact, there is no such cause and effect relationship between microcredit program and better consumption behaviour.

TABLE 3. OLS ESTIMATES OF QUADRATIC MODEL FOR BORROWERS

Items	α_i	β_i	λ_i	δ_i	ϕ_i	τ_i	R ²
Cereal	2.88* (12.31)	-0.68* (-9.93)	0.04* (8.25)	-0.001 (-1.22)	-0.003* (-2.65)	0.003* (1.75)	0.757
Pulses	0.22* (2.22)	-0.03 (-1.15)	0.001 (0.53)	-0.003 (-0.73)	-0.002 (-0.49)	-0.0002 (-0.28)	0.287
Vegetable	0.91* (5.02)	-0.17* (-3.28)	0.008* (2.28)	-0.004* (-4.91)	-0.001 (-1.39)	-0.0004 (-0.33)	0.490
Meat	-1.35* (-3.42)	0.40* (3.46)	-0.026* (-3.05)	0.008* (3.90)	0.001** (0.53)	0.0004 (0.11)	0.164
Milk	-0.62* (-4.46)	0.19* (4.59)	-0.013* (-4.36)	-0.001 (-1.50)	0.001 (1.98)	0.0006 (0.626)	0.109
Cigarettes and betel leaves	-0.815* (-4.73)	0.249* (4.95)	-0.018* (-4.88)	-0.001 (-1.11)	0.001 (1.50)	-0.0008 (-0.67)	0.074
Total	1.18* (2.23)	0.009 (0.05)	-0.11 (-0.98)	-0.003 (-1.34)	-0.001 (-0.63)	0.004 (1.15)	0.462
Food							
Fuel	0.289* (2.35)	-0.059 (-1.64)	0.003 (1.269)	-0.002* (-4.09)	-0.006 (-1.06)	0.002 (2.30)	0.140
Electricity	-0.02 (-0.16)	0.012 (0.29)	-0.74 (-0.23)	- 0.001** (-2.28)	0.001 (1.39)	0.001 1.35	0.022
Clothing	-0.094 (-1.10)	0.03 (1.57)	-0.002 (-1.51)	-0.003 (-0.80)	-0.004 (-0.96)	-0.0008 (-1.31)	0.030
Education	0.17 (0.88)	-0.08 (-1.31)	0.008*** (1.81)	0.002 (1.46)	.009 (0.94)	0.0003 (0.16)	0.193
Health	-0.35* (-2.28)	0.10* (2.40)	-0.007* (-2.19)	0.001 (0.18)	0.007 (1.01)	-0.002* (-2.45)	0.067
Total non-food	-0.18 (-0.35)	-0.009 (-0.05)	0.011 (0.98)	0.003 (1.34)	0.001 (0.63)	-0.004 (-1.15)	0.462

i) Figures within the brackets are the t-statistics.

ii) *, ** and *** indicate significance at 1 percent, 5 percent and 10 percent levels.

Comparing R² values and the functional forms⁴ we find that in most of the cases R² values are greater especially when quadratic models are considered. Notably the functional form (χ^2) is also significant and better in case of quadratic equation. Comparing Table (2) with Table (4), estimated results from the linear equation gave similar results for borrowers as well as for non-borrowers. Negative values of expenditure coefficient for any item indicates it as a necessity item and positive values indicates as a luxury item.

The estimated signs of β_i 's for cereals, pulses, vegetables, total food and fuel are negative and significant for borrowers and non-borrowers, which signifies that these items are necessary for both borrowers and non-borrowers. We have also found that the estimated sign for meat, milk, cigarettes, betel leaves, electricity, education, health and total non-food are positive and not significant for both the groups. We have found a noticeable difference in case of clothing. The estimated sign of β_i for clothing is

positive for borrowers and negative as well as significant for non-borrowers, which makes clothing a necessary item for non-borrowers. It cannot be concluded that the results are significantly different because the R^2 value is very low for clothing item for both borrowers and non-borrowers (for both linear and quadratic model).

TABLE 4. OLS PARAMETER ESTIMATES LINEAR MODEL FOR NON-BORROWERS

Items	α_i	β_i	δ_i	ϕ_i	τ_i	R^2
Cereal	0.958* (15.78)	-0.116* (-13.93)	.001 (0.65)	-002 (-1.19)	0.002 (0.90)	0.614
Pulses	0.11* (5.11)	-0.011* (-3.73)	0.00003 (0.005)	0.006 (0.77)	0.002 (1.48)	0.133
Vegetable	0.52* (12.78)	-0.057* (-10.08)	-0.005* (-5.33)	0.007 (0.54)	-0.0004 (-0.26)	0.381
Meat	-0.006 (-0.06)	0.02** (2.06)	0.01* (4.50)	-0.002 (-080)	-0.006 (-1.65)	0.117
Milk	0.011 (0.45)	0.005 (1.60)	-0.005 (-0.81)	0.006 (0.82)	-0.0006 (-0.57)	0.030
Cigarettes and betel leaves	0.011 (0.31)	0.007 (1.33)	-0.001** (-1.92)	-0.005 (-0.39)	-0.001 (-0.60)	0.085
Total	1.825* (16.04)	-0.162* (-10.37)	0.0009 (0.03)	-0.005 (-1.40)	-0.004 (-0.83)	0.450
Food						
Fuel	0.128* (4.40)	-0.011* (-2.92)	-0.002* (-3.37)	0.008 (0.84)	-0.0007 (-0.59)	0.079
Electricity	-0.047 (-1.55)	0.010* (2.44)	-0.001 (-1.49)	0.001 (1.43)	0.002** 1.75	0.085
Clothing	0.079* (3.84)	-0.004** (-1.72)	-0.005 (-0.95)	-0.001 (-0.20)	-0.001** (-2.00)	0.041
Education	-0.075* (-2.05)	0.013* (2.74)	0.016*** (1.66)	-0.001 (-1.36)	-0.0008 (-0.51)	0.062
Health	-0.028 (-0.80)	0.010** (2.13)	-0.004 (-0.52)	0.001 (1.09)	-0.0007 (-0.48)	0.037
Total non-food	-0.82* (-7.25)	0.162* (10.37)	-0.0009 (-0.03)	0.005 (1.40)	0.004 (0.83)	0.450

i) Figures within the brackets are the t-statistics.

ii) *, ** and *** indicate significance at 1 percent, 5 percent and 10 percent levels.

Comparing Tables 2 and 3 with Tables 4 and 5 respectively, we see that the budget share for education for both borrowers and non-borrowers are not influenced by the family size. However, the negative coefficient for clothing for both borrowers and non-borrowers suggest that, with the increase in family size, budget share of items decreases. Looking at Tables 2 to 5 we see that the budget shares of fuel, electricity, clothing, education and health are not responsive to the dependency ratio for both borrowers and non-borrowers. As can be observed from the tables with the increase in number of non-earners, (which subsequently increases the dependency ratio), the budget share for clothing decreases, and for electricity and health increases for both borrowers

and non-borrowers. Age of borrowers as well as non-borrowers is found not responsive to the budget shares for most items. However, it is found that, as the age of borrowers'/non-borrowers' increases, the budget share for clothing and health decreases.

TABLE 5. OLS PARAMETERS ESTIMATES OF QUADRATIC MODEL FOR NON-BORROWERS

Items	α_i	β_i	λ_i	δ_i	ϕ_i	τ_i	R ²
Cereal	3.64* (6.00)	-0.93* (-5.07)	0.06* (4.44)	.001 (1.01)	-0.002 (-1.49)	0.0009 (0.34)	0.653
Pulses	0.55** (2.29)	-0.14** (-1.97)	0.009*** (1.81)	0.0008 (0.13)	0.005 (0.68)	0.001 (1.23)	0.149
Vegetable	0.86** (2.01)	-0.16 (-1.23)	0.007 (0.79)	-0.005* (-5.25)	0.006 (0.50)	-0.0006 (-0.366)	0.383
Meat	0.72 (0.81)	-0.19 (-0.73)	0.016 (0.82)	0.010* (4.55)	-0.002 (-0.84)	-0.006*** (-1.74)	0.120
Milk	-0.50** (-2.00)	0.16** (2.12)	-0.011** (-2.05)	-0.006 (-0.97)	0.007 (0.93)	0.0003 (-0.30)	0.052
Cigarettes and betel leaves	-0.82** (-2.07)	0.261** (2.17)	-0.019** (-2.11)	-0.002** (-2.09)	-0.003 (-0.28)	-0.0004 (-0.32)	0.108
Total food	4.62* (3.92)	-1.01* (-2.84)	0.06** (2.38)	0.62 (0.20)	-0.005 (-1.54)	0.005 (-1.15)	0.467
Fuel	-0.32 (-1.05)	0.12 (1.35)	-0.010 (-1.48)	-0.002* (-3.49)	0.009 (0.92)	-0.0005 (-0.39)	0.090
Electricity	-0.25 (-0.78)	0.072 (0.74)	-0.004 (-0.64)	-0.001 (-1.53)	0.001 (1.46)	0.002*** (1.81)	0.087
Clothing	0.04 (0.20)	0.005 (0.08)	-0.008 (-0.16)	-0.005 (-0.95)	-0.001 (-0.19)	-0.001 (-1.95)	0.041
Education	-0.60 (-1.56)	0.17 (1.49)	-0.012 (-1.37)	0.001 (1.55)	-0.001 (-1.28)	-0.0005 (-0.33)	0.072
Health	-0.76 (-0.20)	0.02 (0.21)	-0.001 (-0.12)	-0.005 (-0.52)	0.001 (1.09)	-0.0007 (-0.46)	0.037
Total non-food	-3.62* (-3.07)	1.01* (2.84)	-0.06** (-2.38)	-0.006 (-0.20)	0.005 (1.54)	0.005 (1.15)	0.467

i) Figures within the brackets are the t-statistics.

ii) *, ** and *** indicate significance at 1 percent, 5 percent and 10 percent levels.

TABLE 6. OLS PARAMETER ESTIMATES OF LINEAR MODEL FOR ALL

Items	α_i	β_i	δ_i	ϕ_i	γ_i	τ_i	R ²
Cereal	0.96* (35.83)	-0.11* (-32.04)	.002 (0.22)	-0.002 (-2.58)	0.002* (0.74)	0.003** (1.98)	0.686
Pulses	0.16* (15.22)	-0.017* (-12.06)	-0.003 (-0.86)	0.003 (0.075)	-0.001 (-1.38)	0.0004 (0.75)	0.244
Vegetable	0.50* (26.75)	-0.05* (-21.23)	-0.005 (-7.10)	-0.005* (-0.74)	0.003 (1.35)	-0.0003 (-0.27)	0.452
Meat	-0.14* (-3.64)	0.04* (7.85)	0.009* (6.31)	-0.004 (-0.25)	0.03* (6.25)	-0.002 (-1.11)	0.186
Milk	-0.11 (-0.82)	0.008* (4.64)	-0.008 (-1.62)	0.009*** (1.84)	-0.001 (-0.82)	0.00002 (-0.003)	0.050
Cigarettes and betel leaves	0.025 (1.38)	0.004*** (1.81)	-0.001* (-2.76)	0.006 (0.96)	-0.005** (-2.31)	-0.001 (-0.99)	0.039
Total food	1.71* (31.59)	-0.14* (-20.14)	-0.001 (-0.69)	-0.003 (-1.52)	0.02* (3.97)	0.0008 (0.27)	0.453
Fuel	0.13* (10.30)	-0.013* (-7.51)	-0.002* (-5.17)	-0.002 (-0.53)	-0.003 (0.20)	0.001 (1.51)	0.108
Electricity	-0.004 (-0.03)	0.004** (2.01)	-0.001* (-3.06)	0.001*** (1.94)	-0.002 (-1.17)	0.001** (2.14)	0.037
Clothing	0.04* (4.68)	0.001 (0.16)	-0.002 (-0.74)	-0.003 (-1.04)	0.001 (1.19)	-0.001* (-2.38)	0.019
Education	-0.16* (-8.30)	0.02* (9.68)	0.001 (2.59)	0.001 (0.23)	0.003 (1.64)	-0.0002 (-0.20)	0.158
Health	-0.19 (-1.18)	0.009* (4.43)	-0.002 (-0.46)	0.009 (1.50)	-0.001 (-0.61)	-0.002 (-2.25)	0.047
Total non- food	-0.71* (-13.07)	0.14* (20.14)	0.001 (0.69)	0.003 (1.52)	-0.02* (-3.97)	-0.0008 (-0.27)	0.453

i) Figures within the brackets are the t-statistics.

ii) *, ** and *** indicate significance at 1 percent, 5 percent and 10 percent levels.

We see from Table 6 and 7 that the co-efficient of the BNB dummy is significant for cereals, meat, cigarettes, betel leaves, total food and total non-food for the linear model. For the quadratic model, it is significant for meat, cigarettes, betel leaves, total food and total non-food. Therefore, the consumption pattern differs significantly for the items such as cereals, meat, cigarettes, betel leaves, total food and total non-food only. It can also be seen that the BNB dummy is affected positively and significantly for total food items for both linear and quadratic models and negatively for non-food items.

TABLE 7. OLS PARAMETER ESTIMATES OF QUADRATIC MODEL FOR BOTH BORROWERS AND NON-BORROWERS

Items	α_i	β_i	λ_i	δ_i	ϕ_i	γ_i	τ_i	R ²
Cereal	2.89* (13.28)	-0.68* (-10.73)	0.04* (8.93)	-0.004 (-0.42)	-0.003* (-3.19)	0.001 (0.03)	0.002*** (1.64)	0.725
Pulses	0.22* (2.48)	-0.03 (-1.36)	0.001 (0.72)	-0.003 (-0.91)	0.0001 (0.04)	-0.001 (-1.44)	0.0004 (0.712)	0.244
Vegetable	0.91* (5.59)	-0.17* (-3.63)	0.008* (2.51)	-0.005* (-7.30)	-0.006 (-0.870)	0.002 (1.14)	-0.0004 (-0.40)	0.458
Meat	-0.84* (-2.38)	0.24* (2.39)	-0.015** (-1.97)	0.009* (6.45)	-0.002 (-0.15)	0.032* (6.41)	-0.23 (-1.01)	0.191
Milk	-0.53* (-4.62)	0.16* (4.79)	-0.011* (-4.55)	-0.006 (-1.30)	0.001** (2.09)	-0.007 (-0.44)	0.0001 (0.233)	0.086
Cigarettes and betel leaves	-0.799* (-5.21)	0.248 (5.50)	-0.018 (-5.417)	-0.001** (-2.42)	0.008 (1.24)	-0.042*** (-1.91)	-0.0007 (-0.73)	0.086
Total food	1.82* (3.89)	-0.18 (-1.31)	0.002 (0.249)	-0.001 (-0.71)	-0.003 (-1.53)	0.026* (3.93)	0.0008 (0.26)	0.453
Fuel	0.189*** (1.68)	-0.29 (-0.89)	0.0012 (0.499)	-0.002* (-5.19)	-0.002 (-0.56)	-0.004 (-0.25)	0.001 (1.48)	0.108
Electricity	-0.10 (-0.82)	0.034 (0.92)	-0.002 (-0.82)	-0.001* (-2.99)	0.001*** (1.98)	-0.002 (-1.10)	0.001** 2.18	0.039
Clothing	-0.019 (-0.24)	0.018 (0.79)	-0.001 (-0.78)	-0.002 (-0.68)	-0.003 (-1.00)	0.001 (1.25)	-0.001** (-2.34)	0.020
Education	0.126 (0.755)	-0.059 (-1.20)	0.006*** (1.72)	0.001** (2.46)	0.001 (0.15)	0.003 (1.49)	-0.0003 (-0.29)	0.162
Health	-0.30** (-2.14)	0.09** (2.25)	-0.006 (-2.02)	-0.001 (-0.31)	0.001 (1.60)	-0.008 (-0.44)	-0.002** (-2.15)	0.054
Total non- food	-0.82*** (-1.72)	0.181 (1.31)	-0.002 (-0.24)	0.001 (0.712)	0.003 (1.53)	-0.026* (-3.93)	-0.0008 (-0.26)	0.453

i) Figures within the brackets are the t-statistics.

ii) *, ** and *** indicate significance at 1 percent, 5 percent and 10 percent levels.

CONCLUSION

This study aims at investigating the consumption behaviour of borrowers from microcredit programs and comparing that with non-borrowers from non-program villages. We have used primary data collected through a structured questionnaire from three major districts of Bangladesh. In order to investigate the impact of per capita monthly expenditure on budget share of different items consumed by borrowers and non-borrowers both linear and quadratic models have been considered. Furthermore, by adding BNB dummy for pooled data, both linear and quadratic models are estimated. To avoid endogeneity, we have used control group method by selecting non-borrowers from non-program villages.

Family size, age of borrowers/non-borrowers, and dependency ratio are not found significant in most of the cases to determine the consumption behaviour of households. The quadratic model is a better fit than the linear model for both borrowers and non-borrowers and also for pooled data. The BNB dummy for total food and total

non-food gives a conflicting result. As for total food items the coefficients are positive and significant while it is negative and significant for non-food items for both linear and quadratic models.

It has further been observed that non-borrowers spend a greater share of their budget on staple food items such as cereals, pulses and vegetables, which implies they may be relatively poorer than borrowers. On the other hand, the budget share for protein items (such as meat, fishes, milk and eggs) for borrowers appeared more than that of non-borrowers. The proportion of spending on total food items for non-borrowers appeared more than that of total non-food items. Conversely, borrowers' spending on total non-food items are more compared to total food items.

From this discussion it may be concluded that borrowers of microcredit are better off in terms of consumption patterns compared to non-borrowers. But this does not necessarily tell us that borrowers are better off only due to microcredit intervention. It may be the fact that the well-off sections of the society are borrowers of microcredit program. It would be a good research question to pursue in future to uncover whether this is the case. It might warrant redesigning the microcredit programs to accommodate the needs of the target groups at the bottom of the society.

ENDNOTES

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¹ According to Khalily, Imam and Khan (2000), the word "program" is used synonymously with the word "institution" as it considers only those microcredit or micro finance institutions that are providing micro-financial services.

² Since the income figure obtained in the study are self reported.

³ We consider these items are non-essential for the poor Bangladeshi people only.

⁴ The results are not reported here but available on request from the author.

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