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ABSTRACT

There is a growing recognition that the ultra poor are generally not integrated into the current anti-poverty programmes. In this paper, we estimate the long run impacts of a credit plus grant approach, a combination of microcredit, training and some grants, mostly in the form of consumption stipend, on the livelihoods of the ultra poor. Using longitudinal panel data (2012-2016), we show that the intervention increased labour supply, income, and food consumption. We also document a large positive effect on productive assets. The effects on most of the outcomes of interest have been found to be increasing over time. For instance, the programme increased productive asset values by 142 per cent and 259 per cent in the short run (after two years of the intervention) and long run (after four years of the intervention), respectively. Similarly, per capita real income increased by 37 per cent in the long run against 35 per cent in the short run. We also document positive effects on non-food expenditure and savings behaviour. Cost-benefit analysis shows that the average benefits of the programme are 6.65 times larger than its costs. These findings indicate that microcredit can sustainably reduce ultra poverty if some additional supports are combined with it.

ACKNOWLEDGEMENTS

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CHAPTER ONE

INTRODUCTION

'Money makes money and when you have got a little, it is often easy to get more. The great hardship is to get the little' (Smith 1976). In general, it is perceived that giving the poor access to credit will help them to initiate micro enterprise which would increase their income and eventually elevate them out of poverty (Kiiru 2007). Evidence, however, indicates that although microfinance has in general made great strides in helping the poor build businesses, increase income and exit poverty (see, for example, Pit and Khandker 1998; Banerjee *et al.* 2015a), it faces challenges in reaching the poorest of the poor (or the ultra poor) due to both demand and supply side constraints (Hashemi 1997; Hulme and Mosley 1996; Rahman and Razzaque 2000; Morduch 1998). Even if the ultra poor participate in microfinance, some of them are often unable to benefit from it (Ahmed *et al.* 2009; Morduch 1998). Evidence from recent studies on grant based programmes, on the other hand, shows that providing some grants in the form of livestock or other assets along with training and supervision is very effective for reducing ultra-poverty (Banerjee *et al.* 2015b; Blattman *et al.* 2016; Bandiera *et al.* 2016). BRAC, the largest NGO in the world and headquartered in Bangladesh, has been implementing a grant based programme for the ultra poor in Bangladesh since 2002 examined by the above cited study Bandiera *et al*. (2016). The programme is known as Targeting the Ultra Poor (TUP). Originally, it was designed to provide the ultra poor with a grant based support package that includes productive assets (mostly livestock and poultry), weekly stipend, class room training on income generating activity management, home visits for coaching and so forth. From 2007, however, BRAC started to implement a new credit plus grant based support package, along with the grant based support package. In other words, since 2007, BRAC's TUP programme has been implementing two support packages: a grant-based support package and a credit plus grant-based support package. The credit plus grant-based support package provides the ultra poor with enterprise development training, soft-loans[1] conditional on investing it in the enterprises on which training is provided, weekly stipends and inputs to manage the enterprise. Both packages target the ultra poor but the target group of the latter is slightly well-off compared to the former[2]. The idea of implementing different approaches under the TUP programme is to address heterogeneity (in terms of livelihood opportunities, demographic characteristics etc.) among the ultra poor. The credit plus grant support package was introduced based on the presumption that

[1] Low interest rate (20%) and repayment starts after two months of taking the loan.

[2] The participants of the grant based support package, for example, own no more than 10 decimals of land while those of credit plus grant-based support package can own up to 30 decimals of land. (later we will discuss the issue in detail)

some of the ultra poor would be able to effectively utilise microcredit if some other forms of support are combined with it.

Many studies have evaluated the grant-based support package of the TUP programme, and they found significant positive impacts on labour supply, asset accumulation and consumption in the long run (Ahmed *et al.* 2009; Krishna *et al.* 2012, Asadullah and Ara 2016, Bandiera *et al.* 2016). Studies on the effectiveness of microfinance plus grants approach are largely lacking, and our study tries to bridge this knowledge gap by studying BRAC's credit plus grant approach. Das *et al.* (2016) estimate the short run impact (two years after the intervention) of this approach and show positive effects on asset accumulation, income, and food consumption.

Several studies documented the effects of flexible repayment system in microfinance. For example, a recent study by Shonchoy and Kuroshaki (2014) shows that seasonally adjusted repayment in microfinance increases consumption, although this has no effect on repayment and overdue. Field *et al.* (2012) show that clients repaying on a monthly basis, as compared to those paying on a weekly basis, are less likely to report feeling of "worried, tense, or anxious", and rather more likely to report a feeling of confidence in repaying. However, it is not evident from these studies whether these flexibilities help the very poor who have traditionally less access to microfinance (Matin 2004; Morduch 1998).

In this paper, we estimate the long run impacts of the credit plus grant-based support package of the TUP programme on the livelihoods of the ultra poor. Specifically, we estimate the effects of the intervention on labour market outcomes, physical and financial assets, and household welfare (consumption). We find that the programme increased the labour supply of working age members both in the short and long run (i.e. two and four years after the intervention). Similarly, the effect on income has been found to be positive and sustainable. The programme also significantly increased asset accumulation. Specifically, after four years of the intervention, the value of productive assets increased by BDT 12,656 (which is two and a half times the baseline asset value of programme participants) and savings increased by 158 per cent. As a result of the intervention, per capita food expenditure increased by 11 per cent after two years, and it sustained in the long run. Positive effects on non-food expenditure are also visible.

The rest of the paper is structured as follows. Chapter 2 provides an overview of the TUP programme followed by the main features of credit plus grant approach of this programme. Chapter 3 discusses evaluation design and data collection. We present descriptive statistics in chapter 4. In chapter 5, estimation technique is presented, while chapter 6 discusses the results. Finally, we conclude in chapter 7.

CHAPTER TWO

AN OVERVIEW OF BRAC's TUP PROGRAMME

BRAC has been implementing the TUP programme since 2002. The programme was first piloted in three northern districts of Bangladesh and then scaled up across the country. It has also been replicated in the 20 poorest countries across the world. In its first phase (2002-2006) of implementation, 100,000 ultra poor households from rural areas of Bangladesh were covered. They were provided with productive assets (mostly livestock and poultry) as grants, a daily allowance, training and some other kinds of support. With the passage of time, based on programmatic and in-house research learning, BRAC incorporated diversity in programme support. Thus, two different support packages were introduced in 2007 and subsequent cohorts of the programme. To be specific, a grant-based support package for specially targeted ultra poor (referred to as STUP package) and a credit plus grant-based support package for other targeted ultra poor (referred to as OTUP package) have been implemented since 2007. The OTUP support package generally targets the ultra poor who are relatively less vulnerable than those targeted by the STUP package. The focus of this study is on the OTUP package, a credit plus grant approach.

The OTUP support package provides the ultra poor with: (1) enterprise development and life skill training; (2) soft loans[3] from BRAC microfinance conditional on investing it in the enterprise on which training is provided; (3) weekly consumption allowance (BDT 210); (4) input supplies (such as vaccination and medicine for those that invest the loan in livestock and poultry rearing); and (5) health subsidies (BRAC bears health expenses for the household members and provides micronutrient sachets).[4] The participants are initially provided with hands-on training on income generating activities such as cow/goat rearing and cow fattening, after which they receive BRAC loans, conditioned upon investing it in the kind of enterprise on which they have received the training. BRAC also provides them with some additional inputs, such as fodder for cattle. Home visits for providing coaching continue for a period of two years. Hence, the duration of the programme cycle is two years.

[3] Interest rate is low (20%) and repayment starts after two months of taking the loan. Rate of interest charged for regular BRAC microfinance is 25 per cent. Other MFIs in Bangladesh also charge similar interest rates. For example, ASA, another large MFI in Bangladesh, charges 25 per cent interest rate (www.asa.org.bd/loan-product/).

[4] The STUP support package, on the other hand, provides: (1) enterprise development and life skill training; (2) asset transfer - mostly livestock and poultry; (3) weekly consumption allowance; (4) health subsidies; and (5) community mobilisation support.

As mentioned earlier, the soft loan is provided by the BRAC microfinance programme. Members are eligible for a single soft loan. After repaying the soft loan, they can take more loans from BRAC microfinance at around 25 per cent interest rate, a rate generally charged for regular BRAC microcredit schemes.

BRAC selects ultra poor through community wealth ranking and proxy means of verification. Initially, based on the poverty mapping of the World Food Programme, the poorest *upazilas* (sub-districts) are identified. From the selected *upazilas*, communities that have a high concentration of poverty are identified based on the own knowledge of the TUP programme staff or discussion with the staff of other BRAC programmes (microfinance, health, education etc.). In the selected villages, a participatory wealth ranking (PWR) exercise is carried out at the beginning. In the PWR, households are ranked into several wealth groups, such as very poor, poor, middle-class, and non-poor. Afterwards, households from the bottom three wealth groups are visited by programme staff to verify the specific eligibility criteria for the STUP and OTUP support packages.

Eligibility criteria for the OTUP support package are as follows[5]:

- Having ≤30 decimals of land
- Unable to bear children's education expenses beyond the primary level
- Mainly dependent on irregular labour income
- History of failure to make successful use of NGO support in the past
- Failure to avail either fish or meat or eggs in the last three consecutive days

Household visits to check the eligibility criteria proceed as follows. First, households from the bottom two wealth groups of the PWR are checked to see if they are eligible for STUP support package. If not, they are then checked for eligibility for the OTUP support package. Households from bottom third rank of the PWR are also checked with OTUP eligibility criteria. In addition to these inclusion criteria, the programme uses two exclusion criteria: (1) households with no adult women capable of working are excluded as the programme provides support only to women (i.e. programme support is given to the main female member of the selected household although the overall objective of the intervention is to improve welfare of all family members); and (2) participants of microfinance and/or recipients of Government/ NGO support are excluded to avoid duplications. A household must meet at least three out of the above mentioned five inclusion criteria and none of the exclusion criteria to be eligible for the OTUP support package.

[5] Targeting criteria for selecting households for the STUP support package are: (1) household owns ≤10 decimals of land; (ii) children of school going age (5-14 years) are engaged in income generating activities; (iii) household has no productive assets; (iv) household is mainly dependent on irregular earning (from working as a house-maid, day labour, begging etc.) of female members; and (v) has no male members capable of working.

CHAPTER THREE

EVALUATION DESIGN AND DATA COLLECTION

For the purpose of evaluation of the 2012 cohort of BRAC's ultra poor programme, BRAC's Research and Evaluation Division (RED), at the first stage, randomly chose 30 branch offices from the total list of branch offices planned for intervention in the year 2012.[6] Afterwards, for each of these 30 branch offices, a mapping of all nearby branch offices which were not covered by the programme was done. Then, considering geographical proximity, 30 branch offices were purposively selected from these nearby non-intervention branches. These 30 branch offices have been used as comparison or non-participant areas for the purpose of estimating programme impacts. In the second stage, 10 communities/villages[7] were randomly selected from each of the participant and non-participant branch offices. By and large, 600 villages (10*(30+30)) were selected as survey sites for the study.

It is to be noted that, in the intervention branch offices, BRAC programme staff (i.e. the staff that are directly engaged in implementation of the intervention) carried out the selection of eligible ultra poor households using the PWR exercise and proxy means of verification (detailed out in the previous section). Such a rigorous selection, however, was not conducted in the non-intervention branch offices. In lieu of that, in both the intervention and non-intervention areas, RED carried out a small census containing questions related to programme's targeting criteria. After completing the census, households eligible for the OTUP support package were identified from both areas. Next, from each community/village, nine (9) OTUP eligible households (based on availability) were randomly selected for baseline survey.[8] Our plan was to survey a total of 5,400 households; but in some villages we found less than 9 eiligble households. Some of the sample eligible households also declined to participate in the survey.

The baseline survey was conducted in May-July, 2012, covering 4,840 households eligible for the OTUP support package, of which 2,484 were from intervention areas and the rest 2,356 were from non-intervention areas. First follow-up survey was conducted in May-July 2014, when 4,542 households were successfully revisited (2,310 from intervention areas and 2,232 from non-intervention areas). Among the 2,310 eligible households from intervention areas, only 490 households actually participated in the programme. The remaining 1,820 households were either not eligible for the programme support as per the selection carried out by the programme staff or not interested in participating in the programme.

[6] A branch office is a local BRAC office through which all BRAC programmes are implemented. The selection of the ultra poor is carried out through the BRAC branch office. A branch office covers a geographical area of around 5 km radius.

7 We selected 10 communities from each treated branch offices because programme selection is carried out at the community level covering about 80-120 households. If a village contains more than 120 households programme usually divides the village into several communities and carries out selection in each. From the non-participant branches, we randomly selected 10 villages and then took one community with around 120 households.

[8] Nine STUP eligible households were also selected but this study does not focus on the STUP.

Second follow-up survey was conducted in July-August 2016. In this round, we intended to survey only programme participant households from the intervention areas. From the non-intervention areas, on the other hand, this round planned to visit a randomly selected half of the households that were successfully revisited during the first follow-up survey. The second follow-up survey successfully revisited 465 participant households out of 490, and 1,021 non-participant households out of planned 1,142 from the non-intervention areas. This study is based on a balanced panel of 1,486 households (465 participant and 1,021 non-participant households).

Overall, attrition rate was six per cent for the 2014 follow-up survey (7% and 5% for intervention and non-intervention areas, respectively) (Annex Table A1). In the 2016 follow-up survey, the attrition rate was about 6.8 per cent (5.1% for intervention and 8.5% for non-intervention areas). The attrition rate in our sample is fairly low compared to those reported in existing studies on transfer programmes (Bandiera *et al.* 2016; Banerjee *et al.* 2015b).

A semi-structured[9] questionnaire was administered to collect the data. The respondent of the survey was the main female member of the sample households. The questionnaire included questions related to demographic information of all the household members, employment information for the last one year of all the members aging more than five years, asset holding, savings, outstanding loan and lending behaviour, food and non-food expenditure, and the amount of food consumption.

The questionnaire included three-day recall questions to gather dietary information. The respondents were asked to recall all food items they consumed prepared at home and ready foods purchased from the street shops/hotels within the last three days prior to data collection. A checklist of food items was used by the enumerators to help the respondents recall the names and amount of the food consumed.

[9] Answers to a few questions were open-ended.

The checklist also helped them calculate the number of household members who had eaten during those days. The quantity of food consumed at the household level was first estimated in household measures (i.e. cup, spoon, bowl) and then the amount was converted into grams. The amounts of ingredients of cooked food were calculated using a conversion table provided to the enumerators. The food items were pooled into thirteen basic groups for the analysis such as (1) cereals, (2) pulses and legumes, (3) roots and tubers, (4) green vegetables, (5) other vegetables, (6) seeds, (7) fruits, (8) meat, (9) fish, (10) egg (11) milk and milk products, (12) oils/fats, and (13) miscellaneous.

The number of individuals eating per day was calculated based on the number of individuals who ate at least one meal in a particular day. To standardise the consumption at the household level, all children aged below 10 years were weighted 0.5 to convert them into adult equivalent following Gibson (2005) and BBS (2006). Food expenditure was recorded based on the local market price of the foods consumed during the three days prior to data collection. We used the local market values of the foods produced, received in kind or collected otherwise by the households, and included the value to estimate food expenditure. We measured the calorie intake using self-reported household consumption of different food items over the past three days of survey. To calculate calorie intake, we converted the amount of consumption of different food items into standard unit of measurement (100 gram).[10] Then, the calorie intake per 100 gram of each of the different food items was multiplied by the respective amount consumed. A few food items such as salt, water, tea, cigarettes and betel leaf were excluded from the estimation. And finally, we derived the per capita food intake, expenditure and calorie intake by dividing the total household consumption over three days by the number of individuals (including guests) in that household over that time.

[10] Used "Food composition table for Bangladesh 2013". http://www.fao.org/fileadmin/templates/food_composition/documents/FCT_10_2_14_final_version.pdf

CHAPTER FOUR

DESCRIPTIVE STATISTICS

Table 1 contains the baseline characteristics of the programme participant households (i.e. the participants of the OTUP support package) from intervention areas (hereafter referred to as "participant households") and eligible[11] households from non-intervention areas (hereafter referred as "non-participant households"). We have reported statistics for the balanced panel of 1,486 households. At baseline, average household size was 4.02 for the participants against 3.86 for the non-participants; the difference is statistically significant ($p<0.05$). The proportion of households having at least one working age male member was almost the same in the two groups. On the other hand, the proportion of male members engaged in agricultural self-employment was higher for the non-participant group compared to the participant group (31% vs 24%). A similar pattern is observed for female working age members' engagement in agricultural self-employment. In terms of food security, statistics show that almost equal proportions (23%) of both the participant and non-participant groups had available or surplus food in the last one year prior to the baseline survey. Regarding loans, we find that 8 per cent of the participant households and 26 per cent of the non-participant households had outstanding loans at any NGO. As mentioned earlier, the OTUP support package typically targets those that do not have outstanding loan at any NGOs. However, this criterion was often relaxed for extremely vulnerable households; hence, it is not surprising to see that at baseline, some of the participant households had outstanding loans from NGO. Among the participant households, more than one-third of the households had cash savings at baseline against two-thirds of the non-participant households. A very small proportion of the participant households (3%) had the capability to lend out money to others while the proportion was a bit higher for the non-participants (7%).

Looking at the asset holding status of the sample households, we see that the participant households were asset poor at baseline: only 10 per cent owned cows and 15 per cent owned goats. In contrast, a significantly higher proportion of the non-participant households owned cows and goats at baseline (28% and 24% respectively). It should be mentioned here that at the national level, about 62 per cent rural households own livestock in Bangladesh (FAO 2012). About 13 per cent of the participant households had assets worth more than BDT 10,000 against 29 per cent of the non-participant households. Land ownership is an important indicator of socioeconomic status in rural Bangladesh (World Bank 2013). Statistics show that about 97 per cent of the participant households had less than or equal to 30 decimals of land against 100 per cent of the non-participants.[12] However, the amounts of cultivable and homestead lands were very low for both the groups. The average amount of homestead land was 3.48 decimals for the

[11] Eligible as per the selection by research team using census information

[12] Owning less than 50 decimals of land is considered as functionally landless (Quisumbing and Baulch 2009).

Table 1.
Baseline socioeconomic characteristics of the sample households

Indicators	Participants	Non-participants	Difference
Household size (mean)	4.02	3.86	0.16**
Households have working age male member (%)	97.75	97.42	0.33
Households have working age female member (%)	99.71	100.00	-0.29
Male member engage in agricultural self-employment (%)	24.02	30.59	-6.57***
Female member engage in agricultural self-employment (%)	70.07	82.78	-12.71***
Households had available/surplus food in last one year (%)	23.44	22.62	0.82
Households have outstanding loans at NGOs (%)	8.00	26.00	-18.00***
Households have savings (%)	32.47	59.65	-27.18***
Households have outstanding lending out (%)	3.44	6.74	-3.30**
Households have cows/cattle (%)	10.11	28.01	-17.90***
Households have goats (%)	14.62	24.49	-9.87***
Households productive asset value >BDT 10000 (%)	12.69	29.09	-16.40***
Households have land ≤30 decimal of land (%)	97.42	99.80	-2.38***
Amount of homestead land (mean/decimal)	3.48	3.57	-0.09
Amount of cultivable land (mean/decimal)	1.91	1.09	0.81**
Per capita daily income below $1.90 (at 2012 PPP exchange rate) (%)	83.20	66.12	17.08***
Number of observations	465	1021	

Note: ***, **, * denote significance at the 1%, 5% and 10% levels respectively.

participant group and 3.57 decimals for the non-participant group. Average amount of cultivable land was slightly higher among the participants (1.91 decimal) compared to the non-participants (1.09 decimal). According to the World Bank's definition of extreme poverty, those that earn less than $1.90 at PPP exchange rate per capita per day are considered as extreme poor. Our data shows that at baseline, for 83 per cent of the participant households per capita daily income at PPP exchange rate was less than $1.90, against 66 per cent of the non-participants, indicating that most of the participants were extreme poor at baseline.

In general, the descriptive statistics presented in Table 1 indicate that at baseline, the non-participants were better-off in terms of asset holding, employment opportunities and income compared to the programme participants. This is perhaps likely because the non-participants were identified as programme eligible simply based on census information collected by the research team while those that participated in the programme were identified as eligible households through a rigorous process of screening conducted by the programme staff and community people.

Figure 1 graphs the baseline age distribution of the programme participant and non-participant

women. It shows that a negligible proportion of the participants belongs to the elderly group, perhaps indicating that the OTUP support package targets mostly physically active female members.

Figure 2 graphs the number of loans the participants have taken from BRAC after they enrolled into the programme. These loans include the soft loan i.e. the first loan they took after enrolling into the programme. About 42 per cent of the participants took only one loan (i.e. they did not take any loan after the soft loan) and the rest 58 per cent participants took at least two loans. As mentioned earlier, the duration of the programme cycle is two years. Since our sample is from the 2012 cohort, the sample programme participants completed the programme cycle in 2013. Information graphed in Fig. 3 shows that 31 per cent of the programme participants had outstanding loan at BRAC in 2014 (two years after the intervention) and 27 per cent in 2016 (four years after the intervention). The corresponding proportion for the non-participants was about 9 per cent in 2014 and 14 per cent in 2016. Figure 4, on the other hand, shows that in 2016 about 45 per cent of the participants had outstanding loan at other sources (all sources except BRAC) against 62 per cent of the non-participants.

Fig 1.
Age distribution of the respondents (baseline)

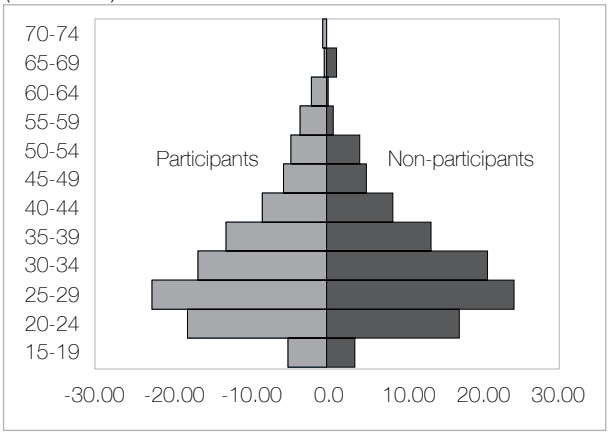


Fig 2.
Total number of BRAC loans taken by programme participants during 2012-2016

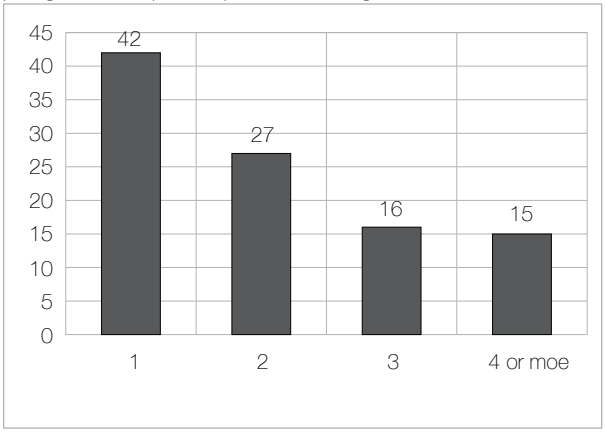


Fig 3.
Outstanding loans at BRAC

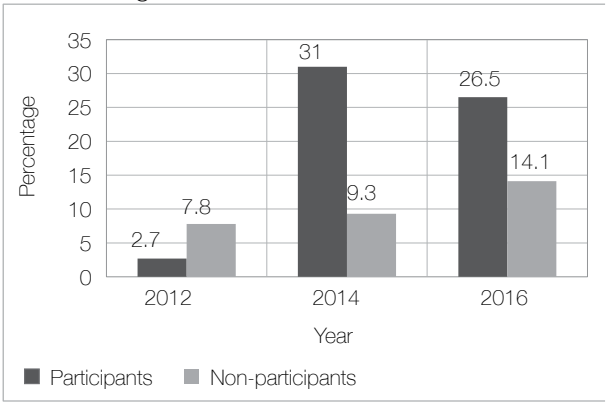
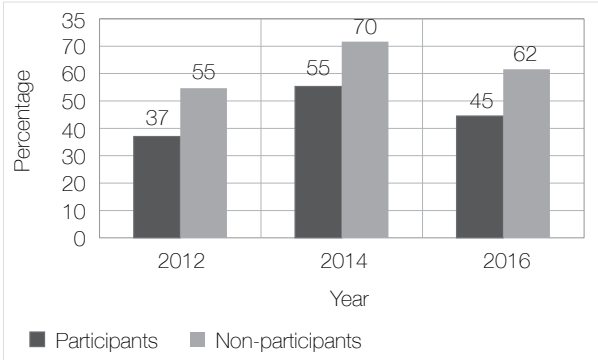


Fig 4.
Outstanding loans from any formal or informal sources (excluding BRAC)



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CHAPTER FIVE

ESTIMATING EQUATION

As the descriptive statistics showed, there are large and statistically significant differences in some baseline characteristics between participant and non-participant households. It is thus likely that the intervention is endogenous to various observable and unobservable characteristics. To identify the causal effect of the intervention, we need to control for these characteristics. For short run impact assessment, we estimate the following equation using data from the baseline (2012) and first follow-up (2014) surveys:

$$Y_{ibdt1} = \tau_i + \delta_1 Year_{t1} + \delta_2 INTV_i * Year_{t1} + \sum_{k=1}^{28} \rho_k District_k * Year_{t1} + \vartheta_{ibdt1} \dots (1)$$

Where, Y_{ibdt1} is the outcome variable of interest for a household or individual i from branch office b and district d in year t1 where t1 refers to the baseline (2012) and first follow-up (2014); $INTV_i$ is a binary variable taking the value of 1 if the individual or household i is a programme participant and zero if not; $YEAR_{t1}$ is a dummy variable taking the value of 1 if t1 refers to the first follow-up survey year (i.e. year 2014) and 0 if otherwise; ϑ_{ibdt1} is an error term; and τ_i are individual/household level fixed effects; and $District_\kappa$ represents district dummies.[13] Standard errors are clustered by branch office level.

For long run impact assessment, on the other hand, we estimate the following equation using data from baseline (2012) and second follow-up (2016) surveys:

$$Y_{ibdt2} = \mu_i + \theta_1 Year_{t2} + \theta_2 INTV_i * Year_{t2} + \sum_{k=1}^{28} \sigma_k District_k * Year_{t2} + e_{ibdt2} \dots (2)$$

Where, Y_{ibdt2} is the outcome variable of interest for a household or individual i from branch office b and district d in year t2 where t2 refers to the baseline (2012) and second follow-up (2016); $YEAR_{t2}$ is a dummy variable taking the value of 1 if t2 refers to second follow-up survey year (i.e. year 2016) and 0 if otherwise, $District_\kappa$ are district dummies; e_{ibdt2} is an error term; and μ are individual level fixed effects. Other variables are as defined earlier. Standard errors are clustered by branch office level.

δ_2 (in equation 1) and θ_2 (in equation 2) identify the short and long run impacts of the intervention (i.e. two and four years after the intervention), respectively. δ_2 and θ_2 are unbiased estimates of the impact of the intervention assuming that there are no omitted variables that are correlated with both INTV (and hence $INTV_i$ * $YEAR_{t1}$; $INTV_i$ *$YEAR_{t2}$) and outcome variables. Since the equations control for household or individual fixed effects, there are no time invariant omitted variables. Hence, to the extent that unobserved differences between programme participants and non-participants are time-invariant, δ_2 and θ_2 are unbiased estimates of the effects of intervention. Unobserved time-variant differences between the

[13] The sample covered 28 districts.

two groups may be due to factors such as the local economy, infrastructure etc. Since we control for district-time fixed effects in the regression equations (i.e ρ_κ in equation 1 and σ_κ in equation 2), such factors are already controlled. Hence, it can be assumed that δ_2 and θ_2 are unbiased estimates of programme impact.

CHAPTER SIX

RESULTS AND DISCUSSION

6.1 IMPACT ON EMPLOYMENT AND INCOME

As noted earlier, the TUP programme support is provided to the main female members of the selected households, although the overall objective of the programme is to improve household welfare. Considering that a household is a unitary model, the programme may affect labour market outcomes for all members of the targeted households, particularly working age (15-65 years old) members. Table 2 documents the impacts of the intervention on working age male and female members' time (hours/day) devoted to earning activities. Panel A shows the estimated effects for female members while panel B shows that for the males. We report the estimates of δ_2 and θ_2 from equations (1) and (2) respectively. As mentioned earlier, δ_2 and θ_2 measure short run (after two years) and long run (after four years) impacts of the intervention. Annex Table A2 reports the trends in time devoted to earning activities.

As can be seen from column 1 of Table 2 (Panel A), female members' time devoted to agricultural self-employment has increased significantly by 0.69 and 0.48 hours per day, two and four years after the intervention, respectively ($p<0.01$). Comparing these estimates with the baseline outcome for programme participants, we find that the programme has increased the females' self-employment by 70 per cent in the short run and 48 per cent in the long run. By contrast, time devoted to agricultural wage-employment has decreased; but these effects are statistically insignificant. A statistically significant positive impact is also documented on the female members' time devoted to salaried employment both in the short ($p<0.05$) and long run ($p<0.01$). Most importantly, we notice that the intervention has significant negative effects on female members' working time devoted to occupations that have little social value, such as maid service and begging. Findings also show that the programme has increased the total labour supply (per person/per day) of the working age females, although the long run effect (0.26 hours) is smaller than the short run effect (0.51). Numerous studies show positive impacts of microfinance on employment of the poor, particularly the women (Hossain 1984, 1988; Kiiru 2007; Osmani 2012; Imai and Azam 2012; Mazumder and Wencong, 2013; Latif 2001). Our results thus echo the positive results for employment documented by earlier studies on microfinance.

Results reported in Panel B of Table 2 show that the intervention increased time devoted to agricultural self-employment of working age males by 0.64 and 0.31 hours per day, two and four years after the intervention, respectively ($p<0.01$). Comparing these estimates with the baseline outcome for programme participants, we find that the programme has increased self-employment by 123 per cent in the short run

Table 2.

Impact on working age (15-65 years old) members' time devoted to earning activities
(Time in hours per day)

	Agricultural self-employment	Non-agricultural self-employment	Agricultural wage employment	Non-agricultural wage employment	Salaried employment	Begging and maid services	Others	All earning activities
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Panel A: Working age females								
Impact after two years of intervention	0.690***	0.061	-0.057	-0.044*	0.042**	-0.153***	-0.032	0.507***
	(0.149)	(0.067)	(0.057)	(0.024)	(0.017)	(0.054)	(0.024)	(0.175)
Adjusted R-squared	0.210	0.030	0.016	0.016	0.010	0.077	0.040	0.127
Impact after four years of intervention	0.475***	0.001	-0.071	0.014	0.114***	-0.193***	-0.083***	0.256
	(0.150)	(0.054)	(0.073)	(0.033)	(0.030)	(0.047)	(0.031)	(0.195)
Adjusted R-squared	0.099	0.023	0.021	0.013	0.022	0.060	0.036	0.064
Baseline mean of outcome of programme participants	0.988	0.170	0.247	0.064	0.023	0.324	0.047	1.860
% change in outcome due to the intervention (after 2 years)	69.83	35.68	-22.90	-68.97	181.53	-47.21	-68.20	27.26
% change in outcome due to the intervention (after 4 years)	48.07	0.47	-28.90	21.32	493.90	-59.56	-175.80	13.76
Panel B: Working age males								
Impact after two years of intervention	0.637***	0.0787	-0.159	0.175	0.114	-0.010	0.014	0.849***
	(0.165)	(0.143)	(0.248)	(0.188)	(0.084)	(0.0135)	(0.040)	(0.238)
Adjusted R-squared	0.102	0.030	0.101	0.039	0.022	0.017	0.071	0.064
Impact after four years of intervention	0.308***	0.165	-0.168	0.0672	-0.100	0.004	0.108*	0.385**
	(0.128)	(0.202)	(0.249)	(0.169)	(0.106)	(0.006)	(0.062)	(0.240)
Adjusted R-squared	0.080	0.024	0.087	0.039	0.054	0.028	0.074	0.081
Baseline mean of outcome of programme participants	0.517	1.844	1.886	0.651	0.252	0.003	0.091	5.240
% change in outcome due to the intervention (after 2 years)	123.23	4.27	-8.43	26.86	45.19	-353.59	14.89	16.20
% change in outcome due to the intervention (after 4 years)	59.58	8.95	-8.91	10.32	-39.64	141.08	119.15	7.35
Number of observations	1486	1486	1486	1486	1486	1486	1486	1486

Note: ***, **, * denote significance at the 1%, 5% and 10% levels respectively. The figures in parentheses are standard errors, clustered at the branch office level. Percentage changes in outcomes due to the intervention are calculated as follows: divide the impact estimates by the baseline mean of the outcome and then multiply by 100.

and 60 per cent in the long run. For other earning activities, no significant impact has been observed. Findings also show that the programme significantly increased the total labour supply (hours per person/per day) of the working age males by 0.85 and 0.39 hour, two and four years after the intervention respectively (Column 8, Panel B).

Overall these results indicate that the intervention increased total labour supply after two years, but the magnitude of the effect decreased to some extent in the long run. This may be due to the fact that the income effect on leisure is generally positive; as we will show below, the intervention significantly increased per capita real income of the participant households.

Since the intervention has increased total labour supply of working age members, one would expect positive effect on income. Figures 5A and 5B graph the baseline and endline (2016) per capita annual income. We see that at baseline non-participants were significantly better-off compared to the participants; but the gap dissipated after the intervention. Table 3 examines the effect on per capita income (at 2012 constant prices) using the regression framework. The results show that due to the intervention, the per capita income of the programme participants increased by BDT 4,663 and BDT 4,847, two and four years after the intervention, respectively ($p<0.01$). How large is the effect? As reported in row 5 of Table 3, the baseline per capita income of the participant households was BDT 13,148, indicating that the magnitude of the effect on per capita income after four years is equivalent to 37 per cent of the baseline income. As already discussed, the magnitude of the effect on labour supply decreased in the long run (Table 2), while as shown in Fig. 5C and Table 3, the long run effect on per capita income is larger. Taken together, these results indicate that the intervention perhaps increased labour productivity or that the production process has become more capital intensive. Figure 5C shows the quintile treatment effects. Results show that households from each quintile experience positive effect. But the impacts are heterogeneous. In both short and long run, the impacts are higher for households from higher quintile. Trends in average per capita income of the programme participants and non-participants have been presented in Annex Table A2.

Fig 5A.
Baseline (2012) annual income distribution

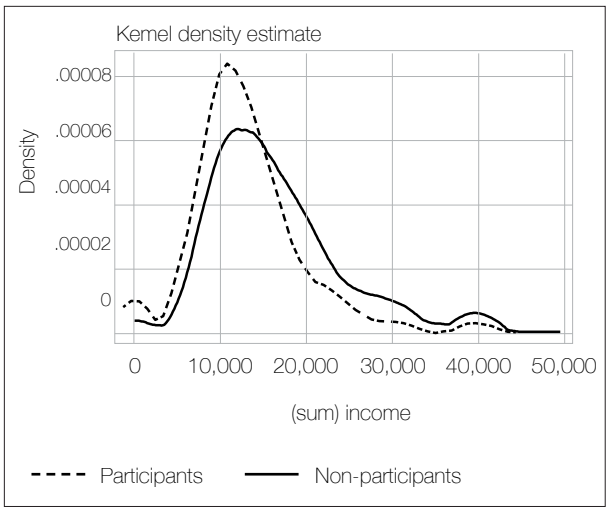


Fig 5B.
Endline (2016) annual income distribution

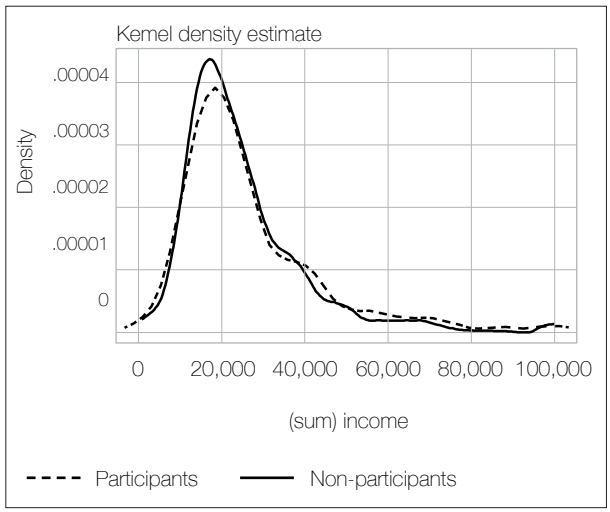


Fig 5C.

Quintile treatment effect on per capita annual income, two (2014) and four (2016) years after the intervention

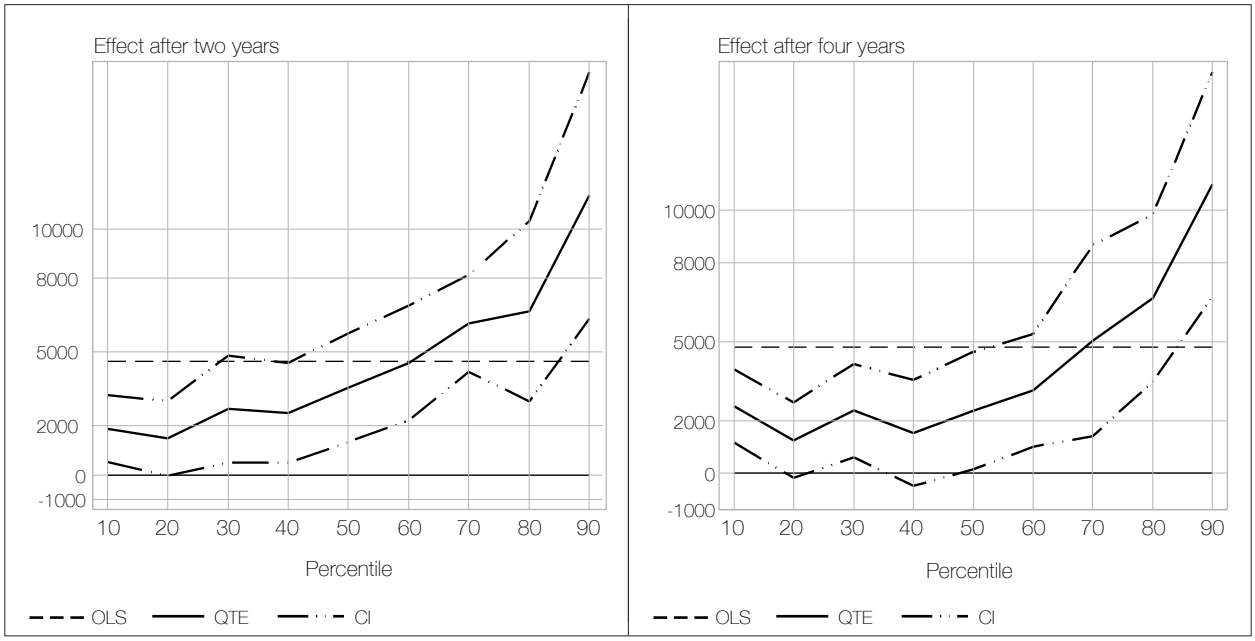


Table 3.

Impact on per capita annual income

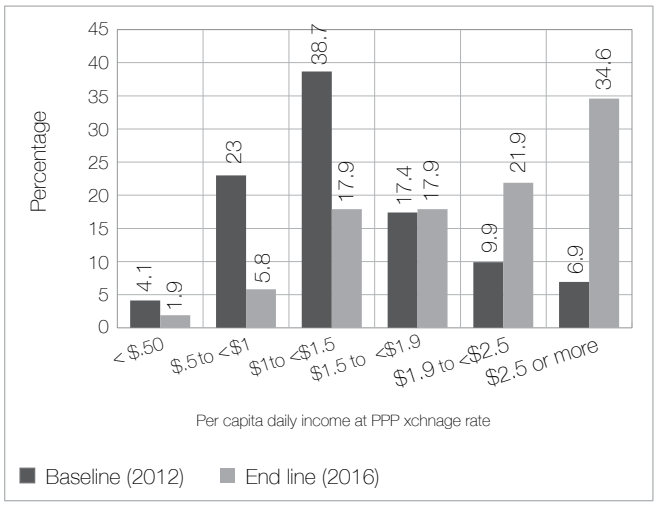
	Per capita annual income (BDT, at 2012 constant prices)
Impact after two years of intervention	4663.2*** (1261.4)
Adjusted R-squared	0.207
Impact after four years of intervention	4846.8*** (1282.7)
Adjusted R-squared	0.329
Baseline mean of outcome of programme participants	13,148
% change in outcome due to the intervention (after 2 years)	35.47
% change in outcome due to the intervention (after 4 years)	36.86
Number of observations	1486

Note: ***, **, * denote significance at the 1%, 5% and 10% levels respectively. The figures in parentheses are standard errors, clustered at the branch office level. Percentage changes in outcomes due to the intervention are calculated as follows: divide the impact estimates by the baseline mean of the outcome and then multiply by 100.

To descriptively analyse the changes in per capita income of the participant households, Fig. 6 shows the distribution of per capita daily income (at PPP exchange rate).[14] It shows that at baseline, 17 per cent of the participant households earned more than $1.90 while in 2016, after four years of the intervention, the proportion jumped to 57 per cent. In addition, another 18 per cent of households were very close to the $1.90 threshold (i.e. they earned $1.5-1.90) in 2016. Most notably, while at baseline 27 per cent households earned less than $1.00 per capita per day, the proportion drastically declined to only 8 per cent in 2016. This dramatic increase in income is mostly due to the intervention, because as already shown (Table 3), per capita income was significantly affected by the intervention.

[14] Per capita income is in PPP-adjusted USD terms: in 2012, 1 USD=25.86 BDT (obtained from the World Bank database). The PPP exchange rate is not available for 2016; we assumed it to be 29.19 because the trends in the PPP exchange rate against BDT show that each year it increases by about 1.

Fig 6.
Distribution of per capita daily income of programme participants



6.2 IMPACT ON ASSETS

The relationship between assets and poverty is quite interesting in the sense that the lack of asset is both an effect and a cause of poverty (IFAD 2001). Research findings tend to suggest that households with a greater ownership of assets typically experience greater reduction in poverty compared to their counterparts with limited or no asset ownership (Lawal *et al.* 2011; Shapiro 2001). On the contrary, durable/non-productive assets do not offer earning opportunities; rather, they indicate socioeconomic status. This section presents the impacts of the intervention on productive, durable, and financial assets.

6.2.1 Impact on productive assets

Results presented in Table 4 (5th row) show that at baseline, the participant households owned on average 0.14 cows, 0.24 goats and 2.9 chickens. The intervention, however, significantly increased the ownership of these assets. Specifically, as reported in rows 1 and 3 of Table 4, two and four years after the intervention the number of cows owned has increased significantly by 0.28 and 0.34 ($p<0.01$), respectively, while the number of goats increased by 0.23 and 0.38 ($p<0.01$). Similarly, the number of chickens increased by 2.49 after four years ($p<0.05$) though the short run impact is statistically insignificant. Looking at asset values, we see that the programme has increased the value of productive assets by BDT 6,898 after two years and BDT 12,656 after four years of the intervention ($p<0.01$) (Column 6 of Table 4). Note that at baseline, participant households owned assets worth BDT 4,887 on average. Hence, the magnitude of the impact on productive asset value after four years is equivalent to 259 per cent of the baseline. As mentioned earlier, the intervention provided the participants with soft loans conditional on investing it in the enterprises (mostly cow and goat rearing) on which training is provided. The positive results documented in Table 4 thus indicate that the participants have not eaten away the assets they purchased using BRAC credit. Trends in productive asset ownership of the programme participants and non-participants are presented in Annex Table A3.

Table 4.

Impact on productive assets

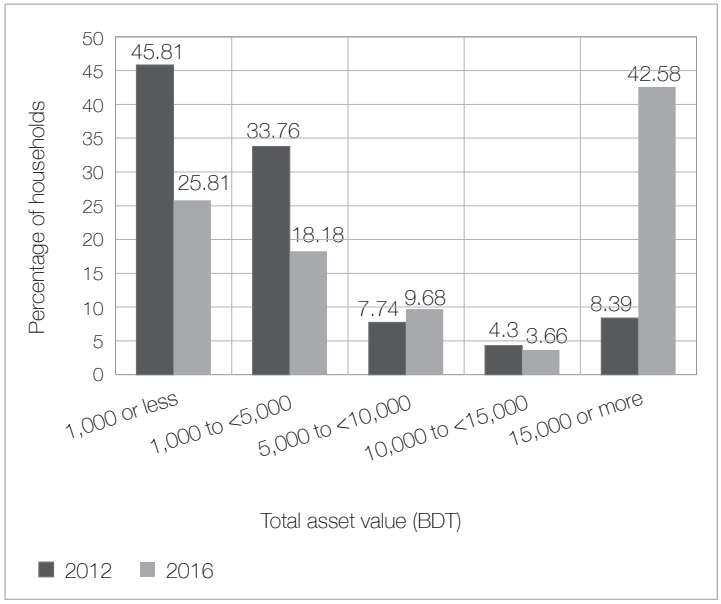
	No. of cows	No. of goats	No. of chickens	No. of rickshaws/ vans	No. of trees	Value of productive assets (BDT/2012 constant prices)
	(1)	(2)	(3)	(4)	(5)	(6)
Impact after two years of intervention	0.282*** (0.061)	0.232*** (0.070)	0.558 (0.476)	-0.029 (0.022)	0.427* (0.245)	6897.5*** (1398.8)
Adjusted R-squared	0.096	0.029	0.075	0.027	0.067	0.083
Impact after four years of intervention	0.342*** (0.080)	0.376*** (0.104)	2.492** (0.895)	0.0027 (0.027)	0.821*** (0.375)	12655.5*** (3583.2)
Adjusted R-squared	0.077	0.046	0.033	0.025	0.094	0.119
Baseline mean of outcome of programme participants	0.138	0.239	2.869	0.146	0.426	4886.8
% change in outcome due to the intervention (after 2 years)	204.35	97.07	19.45	-19.86	100.23	141.62
% change in outcome due to the intervention (after 4 years)	247.83	157.32	86.86	1.35	192.72	258.97
Number of observations	1486	1486	1486	1486	1486	1486

Note: ***, **, * denote significance at the 1%, 5% and 10% levels respectively. The figures in parentheses are standard errors, clustered at the branch office level. Percentage changes in outcomes due to the intervention are calculated as follows: divide the impact estimates by the baseline mean of the outcome and then multiply by 100.

In Fig. 7 we graph the distribution of productive asset value of the programme participants for the baseline and second follow-up surveys. It shows that at baseline (2012), 12 per cent of the participant households owned assets worth BDT 10,000 or more while in 2016, four years after the intervention, the proportion jumped to 46 per cent. On the other hand, at baseline 46 per cent of households owned assets worth less than BDT 1,000, but the proportion declined to 26 per cent in 2016. These results indicate that although the programme has a large positive effect on productive assets, a significant proportion of the participants still own a meagre amount of productive assets.

Fig 7.

Distribution of productive asset values of programme participants



6.2.2 Impact on durable assets

Table 5 documents the effect of the intervention on households durable assets. Annex Table A4, on the other hand, reports the trends in durable asset ownership. We notice that the impacts of the programme on assets such as televisions and electric fans are significantly positive in the long run, although the short run effects are statistically insignificant (Columns 1 and 2 of Table 5). Cell phone ownership increased significantly by 6 percentage points in the short run and it sustained in the long run ($p<0.10$) (column 3 of Table 5). The survey collected information on the market value of household durable assets. Analysing the information, we find positive effects of the intervention; the impact is large in the long run ($p<0.05$). These findings are consistent with those from Mazumder and Wencong (2013) who show that household assets, including furniture, farm implements and electrical goods of women microcredit recipients increased after one year of their engagement with the credit programme.

Table 5.
Impact on durable assets

	No. of televisions	No. of electric fans	No. of cell phones	No. of chairs	No. of tables	Value of non-business assets (BDT/2012 constant prices)
	(1)	(2)	(3)	(4)	(5)	(6)
Impact after two years of intervention	0.031 (0.022)	-0.027 (0.037)	0.066* (0.034)	0.062* (0.038)	0.087** (0.051)	738.7 (889.5)
Adjusted R-squared	0.024	0.068	0.164	0.056	0.085	0.060
Impact after four years of intervention	0.096*** (0.037)	0.060** (0.059)	0.063* (0.031)	0.017	0.019 (0.057)	1664.0** (736.4)
Adjusted R-squared	0.093	0.313	0.242	0.119	0.095	0.076
Baseline mean of outcome of programme participants	0.047	0.200	0.540	0.510	0.503	6023.4
% change in outcome due to the intervention (after 2 years)	65.95	-13.35	12.30	12.09	17.23	12.26
% change in outcome due to the intervention (after 4 years)	201.85	29.85	11.62	3.34	3.74	27.63
Number of observations	1486	1486	1486	1486	1486	1486

Note: ***, **, * denote significance at the 1%, 5% and 10% levels respectively. The figures in parentheses are standard errors, clustered at the branch office level. Percentage changes in outcomes due to the intervention are calculated as follows: divide the impact estimates by the baseline mean of the outcome and then multiply by 100.

6.2.3 Impact on financial assets (credit, savings, and lending out)

Outstanding loan

Impact estimates for outstanding credit show that two and four years after the intervention, programme participants are 19 and 12 percentage points more likely to have outstanding loans at any source (Table 6).[15] These effects are statistically significant at 1 per cent level. Similarly, the effects on the total amount of outstanding loans are positive and statistically significant ($p<0.10$) both two and four years after the intervention. The magnitude of the effects on outstanding credit

[15] For overtime changes in outstanding loans, see Annex Table A4.

is a bit higher in the long run. It needs to be mentioned here that credit itself was a part of the intervention. Hence, the increase in outstanding loans as documented in Table 6 is expected. But what is interesting to see is that the increased access to credit by the participants sustained after completion of the programme cycle, which is evident from the fact that after four years the programme participants have more outstanding loans compared to the non-participants.

Table 6.
Impact on outstanding loans

	Household has outstanding loans (Yes=1, No=0)	Amount of outstanding loans (BDT)
	(1)	(2)
Impact after two years of intervention	0.185*** (0.069)	3817.4* (2095.0)
Adjusted R-squared	0.229	0.068
Impact after four years of intervention	0.120*** (0.069)	4310.9* (2210.6)
Adjusted R-squared	0.191	0.105
Baseline mean of outcome of programme participants	0.389	3383.11
% change in outcome due to the intervention (after 2 years)	47.53	112.84
% change in outcome due to the intervention (after 4 years)	30.83	127.42
Number of observations	1486	1486

Note: ***, **, * denote significance at the 1%, 5% and 10% levels respectively. The figures in parentheses are standard errors, clustered at the branch office level. Percentage changes in outcomes due to the intervention are calculated as follows: divide the impact estimates by the baseline mean of the outcome and then multiply by 100.

Table 7 examines the effects on outstanding loans from different sources. The findings indicate that the programme participants are more likely to have outstanding loans from banks and BRAC compared to non-participants (Columns 1 and 5 of Table 7). In contrast, as documented in column 2 of Table 7, the non-participants are more likely to have outstanding loans from moneylenders, indicating that the programme decreased the participants' dependency on moneylender loans, which often charge a very high rate of interest compared to NGO or bank loans (Mallick 2009). These findings indicate that the programme not only increased access to credit but also helped participants to shift away from moneylender loans. The latter is likely to increase earnings through lowering production costs (assuming that the loan is used for business investment), as moneylender loan's interest rate is higher.

Table 7.
Impact on outstanding loan by source

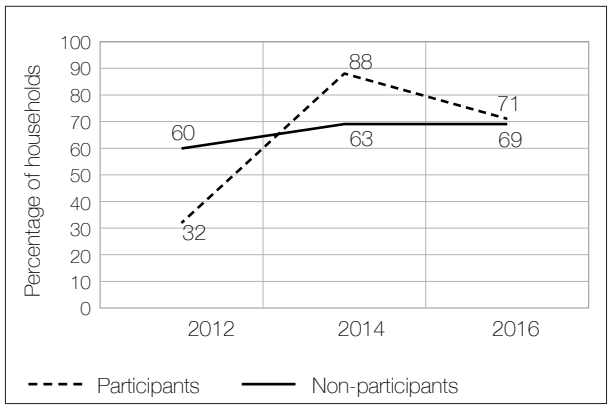
	Household has outstanding loan at					
	Banks (Yes=1, No=0)	Money lender (Yes=1, No=0)	Shops (Yes=1, No=0)	Relatives/ friends (Yes=1, No=0)	BRAC (Yes=1, No=0)	Other NGOs (Yes=1, No=0)
	(1)	(2)	(3)	(4)	(5)	(6)
Impact after two years of intervention	0.057** (0.026)	-0.028* (0.030)	0.016 (0.054)	-0.0038 (0.039)	0.357*** (0.051)	-0.009 (0.023)
Adjusted R-squared	0.029	0.034	0.117	0.057	0.275	0.066
Impact after four years of intervention	0.080*** (0.031)	-0.043** (0.026)	-0.002 (0.034)	0.001 (0.043)	0.169*** (0.043)	0.076** (0.049)
Adjusted R-squared	0.066	0.033	0.283	0.056	0.210	0.103
Baseline mean of outcome of programme participants	0.037	0.039	0.157	0.159	0.030	0.054
% change in outcome due to the intervention (after 2 years)	155.36	-72.85	10.38	-2.37	1185.75	-16.80
% change in outcome due to the intervention (after 4 years)	217.46	-111.03	-1.53	0.57	561.32	141.55
Number of observations	1486	1486	1486	1486	1486	1486

Note: ***, **, * denote significance at the 1%, 5% and 10% levels respectively. The figures in parentheses are standard errors, clustered at the branch office level. Percentage changes in outcomes due to the intervention are calculated as follows: divide the impact estimates by the baseline mean of the outcome and then multiply by 100.

Savings

Figure 8 reports the proportion of sample households with cash savings overtime. As can be seen from Fig. 8, only 32 per cent of the programme participants had cash savings at baseline, which increased to 71 per cent in 2016, indicating 29 percentage points increase. Among non-participants, the proportion increased from 60 per cent to 69 per cent during the same period. These descriptive statistics suggest that the programme may have positive effects on savings behaviour. In Table 8, we formally estimate the effect on the total amount of savings as well as savings at various institutions (BRAC, other NGOs, banks etc.). We notice that the intervention has positive effects on savings (175% and 158% increased two and four years after the intervention, respectively). We also see that there is no statistically significant effect on savings at banks and other NGOs. But the impact on savings at BRAC is very large in magnitude. These findings are expected as microfinance borrowers are required to save regularly. These results echo the findings by Latif (2001) who documents the positive role of microcredit programmes in influencing savings behaviour.

Fig 8.
Trends in percentage of households with savings



Lending out

Looking at the lending out (cash), we find a positive effect of the programme (Table 9). At baseline, only 6.8 per cent of the participant households reported that they had some outstanding lending out to others (Row 5 of Table 9). Due to the programme intervention, the participants are 10 percentage points more likely to lend money to others, both two and four years after the intervention ($p<0.01$).

Table 8.
Impact on savings behaviour (Savings in BDT)

	Total amount of savings	At home	At banks	At BRAC	At other NGOs
	(1)	(2)	(3)	(4)	(5)
Impact after two years of intervention	1608.6*** (555.9)	150.2 (109.9)	138.1 (485.7)	1328.5*** (206.4)	-25.84 (199.0)
Adjusted R-squared	0.067	0.021	0.012	0.227	0.038
Impact after four years of intervention	1449.5* (737.7)	318.1* (183.6)	49.91 (399.8)	531.7 (312.7)	388.8 (411.9)
Adjusted R-squared	0.100	0.014	0.024	0.071	0.070
Baseline mean of outcome of programme participants	917.5	105.3	468.7	30.0	231.9
% change in outcome due to the intervention (After 2 years)	175.33	142.61	29.46	4421.99	-11.14
% change in outcome due to the intervention (After 4 years)	157.99	302.02	10.65	1769.80	167.64
Number of observations	1486	1486	1486	1486	1486

Note: ***, **, * denote significance at the 1%, 5% and 10% levels respectively. The figures in parentheses are standard errors, clustered at the branch office level. Percentage changes in outcomes due to the intervention are calculated as follows: divide the impact estimates by the baseline mean of the outcome and then multiply by 100.

Table 9.
Impact on lending out

	HHs have outstanding lending-out (Yes=1; No=0)
Impact after two years of intervention	0.097*** (0.026)
Adjusted R-squared	0.125
Impact after four years of intervention	0.096*** (0.040)
Adjusted R-squared	0.089
Baseline mean of outcome of programme participants	0.068
% change in outcome due to the intervention (after 2 years)	142.06
% change in outcome due to the intervention (after 4 years)	139.12
Number of observations	1486

Note: ***, **, * denote significance at the 1%, 5% and 10% levels respectively. The figures in parentheses are standard errors, clustered at the branch office level. Percentage changes in outcomes due to the intervention are calculated as follows: divide the impact estimates by the baseline mean of the outcome and then multiply by 100.

6.3 IMPACT ON FOOD CONSUMPTION

The surveys collected information on the consumption of various food items over the last three days prior to data collection. We have analysed per capita consumption of these food items, as well as the calorie intake and expenditure on each item. Household food consumption is generally defined as the total amount of food available for consumption in the household, excluding the food taken outside unless prepared at home (Klaver *et al.* 1982). We have used the same definition.

Table 10 examines the impacts on the amount of food consumption (Panel A), calorie intake (Panel B) and food expenditure (Panel C). Annex Table A5, on the other hand, reports the trends in these outcomes for 2012-2016. As can be seen from panel A of Table 10, cereal consumption has increased significantly by about 25 grams both two and four years after the intervention ($p<0.01$). Pulse consumption, on the other hand, increased significantly by 6 grams four years after the programme intervention ($p<0.10$); but no significant impact is observed for the short run (i.e. after two years). Vegetables (such as roots and tubers, green and leafy vegetables) consumption also increased significantly by 17 and 21 grams in the short and long run, respectively. Statistically significant effects on fruit and meat consumption are found only for long run. We can also see that fish consumption, a protein rich food item, increased significantly by 16 and 12 grams two and four years after the intervention, respectively. Overall, the impact results for the amount of food consumption suggest that the long term impacts are larger compared to the short term. Increase in the consumption of meat, fish and eggs as documented in Table 10 is likely to indicate that the programme may have an impact on the nutritional status of household members. This study, however, does not assess the effect on nutritional status.

Impact estimates for calorie intake and food expenditure reveal almost similar results. Panel B of Table 10 depicts that per capita calorie intake increased significantly by 159 and 178 kcal in the short and long run, respectively ($p<0.01$). Similarly, per capita food expenditure increased significantly by about BDT 3.4 (11% increase) both after two years and four years ($p<0.01$) (Panel C of Table 10). Food item specific impact estimates show that after four years, the programme increased calorie intake from the same items that also experienced an increase in consumption amounts. Regarding food item specific expenditures, however, statistically significant effects are observed for cereals and fish (columns 1 and 5, panel C). For other items, point estimates are positive but they are statistically insignificant. Figure 9 shows the quintile treatment effects on per capita calorie intake. Results show that households from each quintile experienced positive effects both in the short and long run. In the long run the impacts are higher for households from higher quintile.

Table 10.
Impact on food consumption

	Cereals	Pulses	Vegetables	Fruit	Fish	Meat	Egg	Milk	Oil	Total
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel A: Per capita food intake (Gram/per day)										
Impact after two years of intervention	25.44*** (26.58)	4.684 (3.519)	17.35** (11.12)	6.788 (6.133)	15.67*** (4.770)	1.270 (2.470)	3.779*** (1.135)	0.380 (5.693)	3.211*** (1.521)	78.75*** (40.64)
Adjusted R-squared	0.206	0.046	0.108	0.078	0.092	0.034	0.049	0.028	0.156	0.187
Impact after four years of intervention	26.16*** (29.61)	6.229* (3.320)	21.19*** (11.53)	14.46*** (6.938)	11.72** (5.015)	3.930* (2.110)	1.438 (0.967)	2.885 (6.957)	4.222*** (1.326)	93.11*** (45.22)
Adjusted R-squared	0.339	0.053	0.263	0.090	0.127	0.068	0.084	0.043	0.281	0.388
Baseline mean of outcome of programme participants	486.41	15.98	180.00	32.54	32.76	3.88	2.32	15.25	21.13	807.88
% change in outcome due to the intervention (after 2 years)	5.23	29.30	9.64	20.86	47.83	32.73	163.22	2.49	15.20	9.75
% change in outcome due to the intervention (after 4 years)	5.38	38.97	11.77	44.44	35.78	101.27	62.11	18.91	19.98	11.53
Panel B: Per capita calorie intake (kcal, per day)										
Impact after two years of intervention	90.16*** (91.99)	14.64 (11.26)	10.67*** (5.917)	8.280** (5.227)	15.41** (6.756)	1.176 (2.633)	3.035 (1.789)	0.289 (3.809)	14.81*** (5.294)	159.3*** (108.4)
Adjusted R-squared	0.200	0.045	0.113	0.048	0.067	0.032	0.030	0.028	0.212	0.203
Impact after four years of intervention	93.95*** (104.3)	19.73* (10.61)	12.16*** (5.978)	7.512*** (5.253)	22.87* (12.04)	4.661* (2.354)	0.176 (1.581)	1.856 (4.657)	15.03*** (5.359)	178.1*** (124.2)
Adjusted R-squared	0.314	0.051	0.295	0.086	0.148	0.068	0.053	0.044	0.272	0.363
Baseline mean of outcome of programme participants	1699.99	51.68	91.29	34.31	28.97	4.20	3.80	10.22	82.84	2008.11

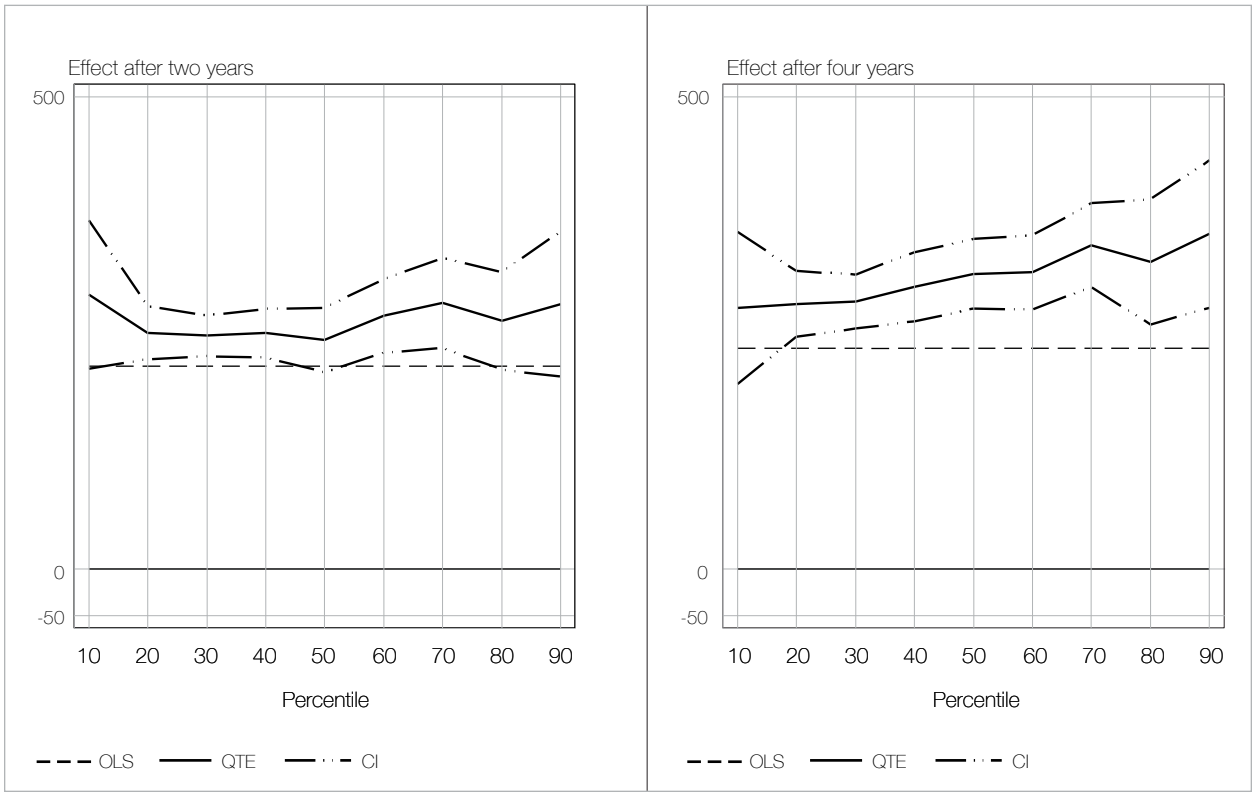
[Table 10. contd...]

[...Table 10. contd]

	Cereals	Pulses	Vegetables	Fruit	Fish	Meat	Egg	Milk	Oil	Total
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Panel C: Per capita food expenditure (BDT 2012 constant prices, per day)										
Impact after two years of intervention	0.309 (0.653)	0.312 (0.294)	0.127 (0.328)	0.095 (0.179)	1.491*** (0.469)	0.0264 (0.299)	0.238 (0.238)	0.103 (0.193)	0.0260 (0.181)	3.440*** (1.776)
Adjusted R-squared	0.262	0.042	0.081	0.043	0.077	0.037	0.025	0.032	0.312	0.144
Impact after four years of intervention	0.345* (0.766)	0.437 (0.287)	0.182 (0.299)	0.142 (0.265)	1.137** (0.460)	0.452 (0.245)	-0.143 (0.185)	0.145 (0.248)	0.100 (0.171)	3.336*** (1.815)
Adjusted R-squared	0.292	0.051	0.189	0.044	0.176	0.073	0.053	0.038	0.440	0.277
Baseline mean of outcome of programme participants	12.32	1.47	4.95	0.51	3.51	0.47	0.53	0.55	2.79	30.11
% change in outcome due to the intervention (after 2 years)	2.51	21.24	2.57	18.55	42.44	5.56	45.02	18.76	0.93	11.43
% change in outcome due to the intervention (after 4 years)	2.80	29.75	3.68	27.76	32.36	95.26	-27.05	26.41	3.58	11.08
Number of observations	1486	1486	1486	1486	1486	1486	1486	1486	1486	1486

Note: ***, **, * denote significance at the 1%, 5% and 10% levels respectively. The figures in parentheses are standard errors, clustered at the branch office level. Percentage changes in outcomes due to the intervention are calculated as follows: divide the impact estimates by the baseline mean of the outcome and then multiply by 100.

Fig 9.
Quintile treatment effect on per capita calorie intake



Further analyses have been carried out to explore the impact on diet quality. For this purpose, we have categorized the sample households with different levels of calorie intake into four groups: (1) High calorie (> 2122 kcal), (2) Medium calorie (1805-2122 kcal), (3) Low calorie (1600-1804 kcal), and (4) Very low calorie (<1600 kcal; for details see Annex Table A6). As can be seen from Table 11, the proportion of programme participants who consumed very low to medium levels of calories has decreased significantly both two and four years after the intervention (columns 1-3 of Table 11) while high calorie consumption has increased significantly (column 4). These findings are consistent with those reported in Table 10. Information in column (4) of Table 11 shows that at baseline 26 per cent of the participant households consumed a high level of calories, and due to the intervention (after four years), 60 per cent more households started to consume high levels of calories, indicating that after the intervention most of the participant households consume high levels of calories.

Table 11.
Impact on calorie intake (disaggregated by high to low levels of calorie intake)

	Very low calorie (consume <1600 kcal=1; otherwise=0)	Low calorie (consume 1600-1804 kcal=1; otherwise=0)	Medium calorie (consume 1805-2122 kcal=1; otherwise=0)	High calorie (consume >2122 kcal=1; otherwise=0)
	(1)	(2)	(3)	(4)
Impact after two years of intervention	-0.021 (0.050)	-0.008 (0.008)	-0.675*** (0.037)	0.657*** (0.048)
Adjusted R-squared	0.129	0.020	0.305	0.293
Impact after four years of intervention	-0.004 (0.054)	-0.009 (0.008)	-0.642*** (0.031)	0.599*** (0.056)
Adjusted R-squared	0.236	0.016	0.450	0.466
Baseline mean of outcome of programme participants	0.04	0.01	0.68	0.26
% change in outcome due to the intervention (after 2 years)	-58.36	-67.50	-98.70	252.48
% change in outcome due to the intervention (after 4 years)	-9.04	-69.60	-93.88	230.19
Number of observations	1486	1486	1486	1486

Note: ***, **, * denote significance at the 1%, 5% and 10% levels respectively. The figures in parentheses are standard errors, clustered at the branch office level. Percentage changes in outcomes due to the intervention are calculated as follows: divide the impact estimates by the baseline mean of the outcome and then multiply by 100.

As mentioned earlier, the programme increased the consumption of several food items. Similarly, calorie intake also increased significantly. We thus explore whether the programme increased nutrient intake. Annex Table A7, on the other hand, reports the trends in these outcomes for 2012-2016. Table 12 presents the impacts on the intake of energy and selected nutrients. Findings show that along with energy, nutrient intake has increased significantly ($p<0.01$). Among the nutrient items, the long run impact on vitamin intake is the largest, documenting a 33 per cent increase due to the intervention (Column 7 of Table 12); the intake of other nutrient items increased by 8-21 per cent. These results indicate that the intervention not only increased the amount of consumption but also diversified the consumption basket. Like the amount of food consumption, the long run impacts for nutrient items are larger compared to the short run.

Table 12.
Impact on energy and nutrient intake

	Energy (kcal)	Protein (g)	Fat (g)	Carbohydrate (g)	Calcium (g)	Iron (g)	Vitamin (g)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Impact after two years of intervention	158.7*** (98.24)	8.169*** (3.146)	4.893*** (2.047)	20.80*** (16.62)	68.04** (28.41)	2.007*** (1.096)	42.17 (33.01)
Adjusted R-squared	0.202	0.159	0.160	0.205	0.094	0.173	0.069
Impact after four years of intervention	179.1*** (114.6)	8.166*** (3.893)	5.722*** (2.334)	23.18*** (19.29)	68.10** (41.67)	2.690*** (1.237)	128.6*** (34.55)
Adjusted R-squared	0.367	0.278	0.332	0.345	0.132	0.324	0.194
Baseline mean of outcome of programme participants	1846.74	55.22	36.64	308.93	320.65	22.22	393.79
% change in outcome due to the intervention (after 2 years)	8.59	14.79	13.35	6.73	21.22	9.03	10.71
% change in outcome due to the intervention (after 4 years)	9.70	14.79	15.62	7.50	21.24	12.11	32.66
Number of observations	1486	1486	1486	1486	1486	1486	1486

Note: ***, **, * denote significance at the 1%, 5% and 10% levels respectively. The figures in parentheses are standard errors, clustered at the branch office level. Percentage changes in outcomes due to the intervention are calculated as follows: divide the impact estimates by the baseline mean of the outcome and then multiply by 100.

6.4 IMPACT ON NON-FOOD CONSUMPTION

Table 13 examines the effects of the intervention on some non-food consumption items. Results indicate that a higher proportion of females from participant households have ceremonial *sarees*[16] compared to the non-participants after the intervention (Column 1 of Table 13). Specifically, the participant women (i.e. main females) were 13 percentage points more likely to have the ceremonial *sarees* after two years, but the magnitude of the effect declined overtime. Similarly, the adult members of the participant households were about six percentage points more likely to have foot wear compared to the non-participant households after two years, but this effect also declined to some extent in the long run (Column 2 of Table 13). Although these effects are found to have declined overtime, analysing expenditure on non-food items (expenditure for different social occasions, cosmetics, clothing, shoes, entertainment, utility bills, housing, etc.), we find evidence that the intervention increased expenditure, and the magnitude of the effect increased in the long run ($p<0.01$). The consumption of non-food items is one of the most important indicators of social status or welfare. These findings thus indicate that the welfare of the programme participants has improved significantly after the intervention. Annex Table A8 reports the trends in these outcomes for 2012-2016.

[16] A traditional Bangladeshi female attire

Table 13.
Impact on non-food consumption

	Main female member has ceremonial *saree* (Yes=1; No=0)	Adult members have foot wear (Yes=1; No=0)	Non-food expenditure (BDT/2012 constant prices, per household)
	(1)	(2)	(3)
Impact after two years of intervention	0.131*** (0.048)	0.060*** (0.036)	3689.2* (3724.5)
Adjusted R-squared	0.061	0.128	0.118
Impact after four years of intervention	0.037* (0.036)	0.049*** (0.034)	7014.3*** (4207.5)
Adjusted R-squared	0.064	0.160	0.104
Baseline mean of outcome of programme participants	0.727	0.951	28810.07
% change in outcome due to the intervention (after 2 years)	18.02	6.33	12.81
% change in outcome due to the intervention (after 4 years)	5.10	5.11	24.35
Number of observations	1486	1486	1486

Note: ***, **, * denote significance at the 1%, 5% and 10% levels respectively. The figures in parentheses are standard errors, clustered at the branch office level. Percentage changes in outcomes due to the intervention are calculated as follows: divide the impact estimates by the baseline mean of the outcome and then multiply by 100.

6.5 ARE IMPACTS LARGER FOR PARTICIPANTS WHO TOOK MORE LOANS?

As mentioned earlier, about 31 per cent of the programme participants took three or more loans (including the soft loans) from BRAC microfinance after they enrolled into the programme. Similarly, 27-31 per cent participants continued to participate in BRAC microfinance after completion of the programme cycle (2012-13). In this section, we examine whether the programme impacts after four years are larger for those that took more loans from BRAC. Specifically, we provide separate impact assessments for those that took one to two loans from BRAC (including the soft loan) and those that took three or more loans from BRAC (including the soft loan). Before estimating the effects, we provide some basic baseline statistics to characterise these two groups of programme participants (Table 14). Statistics show that household size was slightly smaller for those that took more loans from BRAC. Similarly, the number of working age female members and the amount of land holdings were also lower for this group. These differences are statistically significant at the 10 per cent level. For other indicators we do not find significant differences between the two groups. It may be that those who took fewer loans from BRAC took more loans from other sources instead. The information shows (not reported in the table) that during 2012-2016, among those who took three or more loans from BRAC, the proportion of households with outstanding loans from other sources (all sources except BRAC) increased from 31 per cent to 40 per cent. The corresponding proportion among those that took less than three loans from BRAC increased from 40 per cent to 47 per cent during the same period. Hence, there is no evidence that those who took fewer loans from BRAC took more loans from other sources.

Table 14.
Baseline characteristics of the treated households

Indicators	Treated HHs who took three or more loans (1)	Treated HHs who took less than three loans (2)	Difference (3)
Household size (mean/years)	3.87	4.08	-0.21*
Respondent's age (mean)	31.49	32.06	-0.57
Respondent's marital status (married=1; otherwise=0)	0.96	0.95	0.01
Respondent's education (mean/years)	2.88	2.65	0.23
Respondent can keep account (Yes=1; No=0)	0.99	0.96	0.03
Respondent can read and write (Yes=1; No=0)	0.41	0.35	0.06
Working age male member (number)	1.16	1.17	-0.01
Working age female member (number)	1.10	1.17	-0.07*
Households have working age male members (Yes=1; No=0)	0.97	0.97	0.00
Households have working age female members (Yes=1; No=0)	1.00	1.00	0.00
Households have savings (Yes=1; No=0)	0.29	0.34	-0.05
Households have outstanding loans (Yes=1; No=0)	0.33	0.41	-0.08*
Households have lending out (Yes=1; No=0)	0.04	0.03	0.01
Households have had available or surplus food in the last one year (Yes=1; No=0)	0.22	0.24	-0.02
Amount of total land owned (decimal)	3.99	6.82	-2.83*
Households have own house (Yes=1; No=0)	0.94	0.96	-0.02

Note: ***, **, * denote significance at the 1%, 5% and 10% levels respectively.

Table 15 presents the impacts on the two groups of programme participants. We estimate equation (2). Panel A reports the effects for those that took three or more loans from BRAC (including the soft loan) after their enrolment into the programme, while panel B reports the effects for those that took less than three loans from BRAC (including the soft loan). Results show that the impact on savings is larger for those that took three or more loans from BRAC compared to those that took less than three loans. Indeed, the effect on savings for the latter group has been found to be statistically insignificant. Savings is an important financial product of microfinance institutions; borrowers are required to save a certain amount each week/ month. Hence, this finding is anticipated. Looking at the key productive asset items, we find that those that took three or more loans experienced larger impacts on the number of cows and goats owned. For chickens, the result is the opposite. However, impact analysis for productive asset value indicates that total asset value increased by 314 per cent for those that took three or more loans against 235 per cent for those that took less than three loans. These results may indicate that continued microfinance participation is important for crafting a sustainable graduation pathway for the ultra poor through the credit plus grant approach.

Table 15.
Impact heterogeneity with regard to the number of BRAC loans

	Amount of savings (BDT)	Value of productive asset (BDT)	No. of cows	No. of goats	No. of chickens
Panel A: Impact for those that took more than two loans from BRAC					
Impact after four years of intervention	2833.5*** (696.7)	12338.5** (4933.7)	0.372*** (0.129)	0.409*** (0.0808)	2.930** (1.195)
Adjusted R-squared	0.111	0.175	0.061	0.039	0.085
Mean of outcome variable in the baseline	567	4337	0.099	0.120	3.655
% change in outcome due to the intervention (after 4 years)	715.87	314.31	526.41	309.06	28.84
Number of observation	1163	1163	1163	1163	1163
Panel B: Impact for those that took Less than three loans from BRAC					
Impact after four years of intervention	844.0	16536.0*** (5892.3)	0.332*** (0.0940)	0.358** (0.138)	2.350** (1.086)
Adjusted R-squared	0.078	0.129	0.051	0.039	0.032
Mean of outcome variable in the baseline	1071	5129	0.155	0.291	2.523
% change in outcome due to the intervention (after 4 years)	38.50	235.41	200.26	104.46	114.26
Number of observations	1344	1344	1344	1344	1344

Note: ***, **, * denote significance at the 1%, 5% and 10% levels respectively. The figures in parentheses are standard errors, clustered at the branch office level. Percentage changes in outcomes due to the intervention are calculated as follows: divide the impact estimates by the baseline mean of the outcome and then multiply by 100.

6.6 COST-BENEFIT ANALYSIS

In order to compare the costs of the OTUP support package with its benefits, we have conducted a cost-benefit analysis. Table 16 uses the estimated programme impacts to measure the magnitude of the benefits relative to the programme costs. The average cost per treated household for the two year programme is about $281 for the 2012 cohort.[17] We initially set the social discount rate at 5 per cent and conduct sensitivity analysis for alternative discount rates.

Following Bandiera *et al.* (2016)[18] and Banerjee *et al.* (2015a)[19], we assume that the consumption benefits for programmes like the one we examined in this study will continue for about 20 years. These benefits include yearly changes in consumption expenditure (both food and non-food expenditure). We also consider productive assets as a benefit indicator, but we take a one-off change in productive assets as measured in year four. The underlying assumption is that the effect of increased productive asset value will be used for future consumption purposes as

[17]Using the exchange rate of BDT 79 per USD

[18]Bandiera *et al.* (2016) estimated the benefits for 20 and 10 years after the intervention using 5% and 10% social discount rates, respectively.

[19]Banerjee *et al.* (2015a) estimated the benefits at 5%, 7% and 10% social discount rates three years after the intervention.

suggested by Bandiera *et al.* (2016). Household consumption expenditure includes: food (both purchased and produced), fuel, cosmetics, entertainment, transportation, utilities, clothing, footwear, utensils, textiles, dowries, education, charity and legal expenses. Productive assets include livestock, trees, agricultural equipment and other machinery used for production. All monetary amounts are adjusted to 2012 constant prices and deflated using the CPI[20] published by Bangladesh Bank. Rows 1-4 (panel B) of Table 16 report the estimated effects on consumption for every year after the intervention up to the fourth year. These figures are calculated based on the impact estimates reported in Tables 10 and 13.[21] The year 2 and 4 effects are from our first and second follow-up surveys, respectively, while the 1 and 3-year effects are based on linear interpolation. Row 5 reports the net present value of future consumption changes from year 5 onward, assuming that year 4 changes are repeated for 20 years after the transfer date (so 16 more years after year 4). Row 6 reports the change at year 4 in the value of household assets (i.e. productive assets) and row 7 adds these up to compute the net present value of benefits. This is divided by the programme cost to obtain the benefit/cost ratio in Row 8. The estimates show that the average benefits of the programme are 6.65 times larger than the costs.[22]

Table 16.
Cost-Benefit Analysis

(Costs and benefits in BDT)

Panel A. External parameters	
Cost per household at year 0 (BDT)	22,199
Cost per household discounted at year 4 Social discount rate = 5%	26,983
Panel B. Estimated Consumption Benefits	
Change in household consumption expenditure at year 1	8,121
Change in household consumption expenditure at year 2	8,678
Change in household consumption expenditure at year 3	9,273
Change in household consumption expenditure at year 4	11900
NPV Change in household consumption expenditure from year 5 for 20 years	128,974
Change in household assets at year 4	12,656
Total benefits (1+2+3+4+5+6)	179,602
Benefits/cost ratio (assuming benefits last for 20 years from transfer date)	6.65
Social discount rate = 5%	
Benefits last 10 years from transfer date	4.17
Benefits last 15 years from transfer date	5.56
Social discount rate = 10%	
Benefits last 10 years from transfer date	3.97
Benefits last 15 years from transfer date	4.90
Benefits last 20 years from transfer date	5.46

Note: Household consumption expenditure includes: food (both purchased and produced), fuel, cosmetics, entertainment, transportation, utilities, clothing, footwear, utensils, textiles, dowries, education, charity and legal expenses. Productive assets include livestock, trees, agricultural equipment and other machinery used for production. All monetary amounts are adjusted to 2012 constant prices and deflated using the CPI published by Bangladesh Bank.

[20]Consumer Price Index

[21]For example, the figure reported in row 2 is calculated as follows: the per year consumption increase due to the intervention is BDT 4988.8 (3.4*4.02*365 i.e. two year impact*household size*365) (see Table 10). The per year effect on non-food expenditure is 3689.2 (see Table 13). So, the total consumption effect for year 2 is 8678.

[22]Using the same methods, Bandiera *et. al.* (2016) report an average benefit-cost ratio of 3.21, while Banerjee *et al.* (2015a) report an average benefit-cost ratio of 1.59 for the six pilots.

CHAPTER SEVEN

CONCLUSION

The elimination of extreme poverty by 2030 is the top development agenda for poor nations. Evidence, however, indicates that the poorest are being bypassed by existing anti-poverty programmes. BRAC, the largest NGO in the world has been implementing an anti-poverty programme titled "Targeting the Ultra Poor (TUP)" since 2002. Originally, the programme was designed to transfer productive assets, skills and consumption stipends to the ultra poor. Considering the heterogeneity among the ultra poor themselves, since 2007, the TUP programme has been implementing two intervention packages: (1) a grant-based support package for specially targeted ultra poor, or the STUP support package, and (2) a credit plus grant support package for the other targeted ultra poor, or the OTUP support package. The latter targets the ultra poor that are relatively well-off compared to those targeted by the former. The OTUP support package provides the ultra poor with, among others, soft loans, a consumption stipend and training on income generating activities. A large number of literature shows that transfer programmes (such as BRAC's asset transfer programme i.e. STUP support package) can sustainably address ultra-poverty (Banerjee *et al.* 2015b; Blattman *et al.* 2016; Bandiera *et al.* 2016). This type of programme, however, requires a large investment. In this paper, we examine whether the OTUP support package of BRAC's TUP programme, a credit plus grant approach which is less costly compared to the grant-based support package, can address ultra-poverty in a sustainable manner. We have focused on the 2012 cohort of the programme, and used 2012-2016 panel data on 1,486 households to estimate the programme impacts.

Descriptive statistics presented in this paper showed that at baseline, close to 85 per cent of the households targeted by the OTUP support package earned less than $1.90 per capita per day at 2012 PPP exchange rate, indicating that most of the targeted households were extreme poor as per the World Bank definition. Further, they were found to be asset poor at baseline. For example, only 10 per cent of the participant households owned cows, 15 per cent owned goats and 8 per cent owned cultivable land.

We find positive effects of the credit plus grant approach on self-employment, total labour supply, per capita income and food consumption. Importantly, our findings indicate that the impacts of the intervention on most of the outcomes of interest not only sustain in the long run but also increase over time. For example, as a result of the programme intervention, productive asset value increased by 142 per cent and 259 per cent in the short run (i.e. two years after the intervention) and long run (i.e. four years after the intervention), respectively. The intervention also improved non-food expenditure (28% in the long run) and savings behaviour (258% in the long run). Cost-benefit analysis shows that the average benefits of the programme are 6.65 times larger than the costs. The benefit-cost ratio of the credit plus grant approach we study in this paper is larger than

the programme that transfers productive assets (Banerjee *et al.* 2015b; Bandiera *et al.* 2016), although one should be careful in comparing these results because the target groups of these programmes are not comparable. Nonetheless, our findings indicate that microcredit can generate large gains for the ultra poor and help lift them out of ultra-poverty if some additional support is combined with it.

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ANNEXURES

Table A1.

Sample size and attrition rate

Year	Total	Participant	Non-participant
2012	4,840	2,484	2,356
2014	4,542	2,310	2,232
2016	1486	465	1021
Attrition rate in 2014 (%)	6.16	7.00	5.26
Attrition rate in 2016 (%)	6.81	5.10	8.50

Table A2.

Trends in income and labour supply (15-65 years old members)

	2012		2014		2016	
	Participant	Non-participant	Participant	Non-participant	Participant	Non-participant
Per capita annual income (BDT, at 2012 constant price)	13148	16468	20010	19899	21196	19834
Male members time (hours per day) devoted to:						
Agri-self employment	0.52	0.85	1.03	0.86	0.91	0.82
Non agri-self employment	1.84	1.60	1.99	1.77	1.82	1.59
Agri wage employment	1.89	1.97	1.22	1.53	1.24	1.56
Non agri wage employment	0.65	0.75	0.67	0.67	0.69	0.79
Salaried	0.25	0.26	0.40	0.38	0.41	0.46
Servant	0.00	0.01	0.00	0.04	0.00	0.00
Others	0.09	0.06	0.27	0.18	0.32	0.22
Female members time (hours per day) devoted to:						
Agri-self employment	0.99	1.29	1.94	1.54	1.57	1.44
Non agri-self employment	0.17	0.20	0.22	0.25	0.16	0.22
Agri wage employment	0.25	0.10	0.21	0.13	0.17	0.14
Non agri wage employment	0.06	0.01	0.03	0.03	0.08	0.02
Salaried	0.02	0.07	0.03	0.06	0.07	0.04
Servant	0.32	0.08	0.08	0.10	0.10	0.09
Others	0.05	0.04	0.10	0.11	0.05	0.10

Table A3.

Trends in productive asset holding, 2012-2016

	2012		2014		2016	
	Participant	Non-participant	Participant	Non-participant	Participant	Non-participant
Cows (Number)	0.14	0.50	0.55	0.57	0.56	0.55
Goats (Number)	0.24	0.49	0.38	0.42	0.57	0.50
Chickens (Number)	2.87	2.76	4.74	3.74	6.67	4.22
Rickshaws/vans (Number)	0.15	0.11	0.13	0.11	0.15	0.11
Trees (Number)	0.43	0.50	1.21	0.93	1.69	0.96
Value of business assets (BDT)	4887	10841	15280	14222	29175	22581

Table A4.

Trends in durable and financial asset holdings, 2012-2016

	2012		2014		2016	
	Participant	Non-participant	Participant	Non-participant	Participant	Non-participant
Durable asset ownership						
Televisions (Yes=1, No=0)	0.05	0.11	0.09	0.14	0.20	0.21
Electric fans (Yes=1, No=0)	0.20	0.25	0.28	0.35	0.58	0.57
Cell phones (Yes=1, No=0)	0.54	0.62	0.80	0.78	0.86	0.86
Chairs (Yes=1, No=0)	0.51	0.56	0.65	0.62	0.73	0.73
Tables (Yes=1, No=0)	0.50	0.50	0.67	0.58	0.66	0.61
Value of durable assets (BDT)	6023	7269	9190	9627	11515	9201
Financial market participation						
Households have savings (Yes=1, No=0)	0.32	0.60	0.88	0.69	0.71	0.69
Households have outstanding loans (Yes=1, No=0)	0.39	0.60	0.77	0.77	0.66	0.71
Households have lending out (Yes=1, No=0)	0.03	0.07	0.22	0.15	0.18	0.10

Table A5.

Trends in the amount of food consumption, calorie intake and food expenditure, 2012-2016

	2012		2014		2016	
Per capita food intake (gram per day)	Participant	Non-participant	Participant	Non-participant	Participant	Non-participant
Cereals	486.41	515.83	530.22	522.39	544.73	536.60
Pulses	15.98	17.47	22.47	17.81	26.72	21.38
Vegetables	180.00	183.28	191.51	174.42	249.21	227.37
Fruit	32.54	32.50	41.76	32.45	49.50	30.55
Fish	32.76	47.66	62.56	52.65	64.57	54.88
Meat	3.88	5.12	6.57	6.16	11.52	7.49
Eggs	2.32	2.36	7.27	3.85	7.65	5.92
Milk and milk products	15.25	16.28	21.71	15.79	26.87	21.23
Oil	21.13	21.39	23.78	20.42	28.27	24.22
Miscellaneous	11.26	8.32	14.01	11.48	15.30	10.77
Total food intake	807.88	856.99	926.22	861.55	1030.22	947.73
Per capita calorie intake (kcal per day)						
Cereals	1699.99	1802.00	1834.43	1810.41	1883.62	1859.81
Pulses	51.68	56.44	71.24	56.51	85.13	67.91
Vegetables	91.29	95.59	93.86	85.66	129.84	118.86
Fruit	34.31	37.51	41.70	36.75	46.35	38.67
Fish	28.97	48.69	52.05	50.13	110.26	102.21
Meat	4.20	5.57	7.05	6.67	12.96	8.35
Eggs	3.80	3.92	7.84	5.60	9.09	8.57
Milk and milk products	10.22	10.91	14.54	10.55	17.99	14.31
Oil	82.84	90.24	94.08	84.63	98.85	89.22
Miscellaneous	0.82	0.20	0.94	0.86	0.66	0.35
Total calorie intake	2008.11	2151.07	2217.75	2147.77	2394.76	2308.26
Per capita food expenditure (BDT, per day, at 2012 constant prices)						
Cereals	12.32	12.66	13.60	13.43	13.43	12.78
Pulses	1.47	1.43	1.72	1.32	2.10	1.70
Vegetables	4.95	4.86	5.46	4.97	6.31	5.53
Fruit	0.51	0.46	0.56	0.40	1.03	0.56
Fish	3.51	5.01	6.25	5.54	7.36	6.78
Meat	0.47	0.64	0.82	0.91	1.54	1.09
Eggs	0.53	0.53	0.90	0.64	1.14	1.08
Milk and milk products	0.55	0.61	0.77	0.53	0.89	0.69
Oil	2.79	2.69	2.26	2.05	2.03	1.75
Miscellaneous	2.50	2.83	3.21	2.76	3.15	2.96
Total food expenditure	30.11	32.29	36.13	33.07	39.67	35.54

Table A6.

Diet quantity and quality

Aspects of food quality and food security (quantitative)	Indicator (s) used	Categories
Diet quantity	Per day per capita food energy consumption	High calorie consumption (>2122 kcal)
		Medium calorie (1805-2122 kcal)
		Low calorie (1600-1804 kcal)
		Very low calorie (<1600 kcal)

Table A7.

Trends in nutrient intake, 2012-2016

	2012		2014		2016	
Nutrient	Participant	Non-participant	Participant	Non-participant	Participant	Non-participant
Energy	1846.74	1971.26	2103.86	1994.65	2227.63	2101.89
Protein	55.22	62.22	70.21	64.49	74.70	68.29
Fat	36.64	38.75	43.29	38.60	48.45	43.20
Carbohydrate	308.93	329.35	345.11	333.98	358.54	345.57
Calcium	320.65	383.17	467.69	400.53	505.70	437.02
Iron	22.22	24.01	25.68	24.30	28.08	26.16
Vitamin	393.79	407.89	451.59	394.35	636.55	511.79

Table A8.

Trends in non-food expenditure, 2012-2016

	2012		2014		2016	
	Participant	Non-participant	Participant	Non-participant	Participant	Non-participant
Main female member has a ceremonial *saree* (Yes=1, No=0)	0.73	0.80	0.88	0.80	0.82	0.81
Adult members have sandals (Yes=1, No=0)	0.95	0.98	0.99	0.99	0.98	0.97
Total nonfood expenditure (BDT, at 2012 constant prices)	28810	27732	38121	36757	35071	31120

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