Assessing the Frontiers of Ultra-Poverty Reduction: Evidence from CFPR/TUP, an Innovative program in Bangladesh

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Abstract

This paper uses household panel data to provide robust evidence on the effects of BRAC's Targeting the Ultra-poor Program in Bangladesh. Our identification strategy exploits type-1 errors in assignment, comparing households correctly included with those incorrectly excluded, according to program criteria. Evidence from difference-in-difference matching and sensitivity analysis shows that participation had significant positive effects on income, food consumption and security, household durables, and livestock, but no robust impact on health, ownership of homestead land, housing quality and other productive assets. Using quantile difference-in-difference, we find that the income gains from program participation is smaller for the lowest two deciles.

Keywords: Ultra-poor, CFPR/TUP, BRAC, Bangladesh, Assignment Error, Difference-in-Difference, Matching, Quantile

JEL Clodes: O1, I3

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Introduction

It is increasingly appreciated, both by practitioners and academics alike, that extreme poverty (or ultra-poverty) is qualitatively different from other forms of poverty and deprivation (see, for example, IFPRI (2007), Matin et. al. (2008), WDR (2006), Lipton (1983)).[1] Ultra-poverty differs from conventional poverty in terms of depth (degree of deprivation), length (duration of time) and breadth (the number of dimensions such as illiteracy, malnutrition etc.).[2] The possible complementarity among the different dimensions is argued to potentially result in multiple mutually reinforcing poverty traps. This makes ultra-poverty a qualitatively different problem to address than conventional poverty.

The experience of last few decades suggests that while the poverty programs of NGOs including microcredit programs have, in general, been successful in reaching the moderate poor (i.e., households below poverty line, but relatively close to it), the poorest of the poor are more often inadequately served or completely bypassed by such programs.[3] This appreciation led to the development and implementation of innovative anti-poverty programs that are designed especially for the ultra-poor. These programs address the multitude of interrelated factors that create the conditions of extreme poverty and make it a trap

[1] Although there is a growing consensus that extreme or ultra-poverty is an important and difficult problem requiring novel intervention strategies, the concept of "ultra-poverty" remains unsettled. There are different definitions in the literature: Lipton (1983) defines ultra-poverty in terms of a calorie intake threshold (a person is ultra-poor if he/she gets 80 percent or less calorie of an appropriate poverty line calorie benchmark); a recent IFPRI report (2007) identifies an individual as ultra-poor if he/she lives on less than 54 cents per day. Emran, Shilpi, and Stiglitz (2008) define ultra-poverty in terms of endowments and access to markets; physical and human capital endowments of the ultra-poor are so low that it results in exclusion from both labor and formal credit markets. In this paper, we do not focus on how to define or identify the ultra-poor, taking the BRAC identification scheme as given for the empirical analysis. The BRAC definition refers to "not being able to meet even the barest of the basic needs". For recent analysis of issues related to identification and proper targeting of the ultra-poor, see Banrejee et. al. (2008) and Sulaiman and Matin (2006).

[2] For discussions, see World Bank (2000), Smith (2005), and Chronic Poverty Research center (2008).

[3] BRAC founder Fazle Hasan Abed lamented that, "despite our efforts, we have not succeeded in reaching the ultra poor" (Smith 2005 p. 90).

difficult to escape from.

BRAC, formerly known as the Bangladesh Rural Advancement Committee, had been at the forefront of such innovative programs for addressing extreme poverty. In 2002, BRAC developed and implemented an innovative anti-poverty program called "Challenging the Frontiers of Poverty Reduction: Targeting the Ultra-poor, Targeting Social Constraints" (henceforth TUP). The first phase of the TUP program was implemented over 2002-2006. It covered 100,000 ultra-poor households from 15 of the poorest districts of Bangladesh over a period of five years.[4] TUP is a multidimensional program that incorporates both livelihood protection and promotion components. It features significant innovations in targeting (through participatory wealth ranking by the villagers) and harnessing social capital (through village support networks and sponsorship of community leaders). It focuses on developing human capital (health, education, and training) and physical capital (asset transfers) for poor women with the goal of helping them graduate to the standard micro-credit program of BRAC. The program provides ongoing training in enterprise activities using the transferred asset, and also provides health services. A more complete discussion of the program is provided in Section 2. TUP as a strategy to tackle ultra-poverty has attracted much attention over last few years among NGO communities and academic researchers. Similar programs are already being replicated in several other countries including Uganda and Tanzania.[5]

This paper uses a two period panel data set (2002, 2005) to analyze the effects of the

[4]A second phase of the TUP program covering 40 districts was initiated in 2007. 863,000 households are expected to participate in the second phase over five years (2007-2011). This paper provides evidence of the effects of the first phase of the TUP program. For more details on the second phase of the TUP program, see BRAC Annual Report 2007.

[5]Other examples of programs for ultra poverty include the Grameen beggars program and the Bandhan "Chartering into Unventured Frontiers- Targeting the Hardcore Poor (CUF-THP) program.

first phase of the TUP program on a set of household outcomes including income, food security, health, productive assets, household durable goods, and women empowerment.[6] The assignment errors in the selection of participants in the TUP program (according to the inclusion and exclusion criteria set out by BRAC) are used to partition the sample to generate appropriate treatment and comparison groups.[7] Our preferred treatment (called SB_1, or 'should be, one') and comparison (called SB_0, or 'should be, zero') groups are identified on the basis of type 1 error. The treatment group thus consists of the households who satisfy the BRAC inclusion and exclusion criteria and thus are correctly selected into the program, while the comparison group consists of the households who are incorrectly excluded from the program according to the stated criteria.[8] The differences in the initial economic characteristics between the treatment-comparison pair $SB_1$and SB_0 are much smaller compared to the BRAC's own classification called SUP (selected ultra-poor, i.e., the treatment group) and $NSUP$ (not selected ultra-poor). The treatment group SB_1 also consists of the poorest of the households in our sample (i.e., the ultra-poor) and thus represents the appropriate treatment group given that the focus of the TUP program and our evaluation is on this specific disadvantaged group.

To provide robust evidence on the treatment effect of participation in the TUP program, we use a rich set of econometric techniques. Starting from a simple difference-in-difference

[6]An earlier version of the paper did not include the results on productive assets and household durable goods such as tubewells and blankets.

[7]A descriptive analysis of the TUP program was done by BRAC's in-house research and evaluation division (RED) using the same panel data set (see Rabbani et. al. 2006). They use the selected ultra poor (SUP) as the treatment group and the not selected ultra-poor (NSUP) as the comparison group.

[8]It is possible that at least some of the eligible households are excluded from the program to create an appropriate comparison group, or for some other reasons. We do not have any systematic information about the nature of these exclusions. Whether an outcome of accident or designed to create a comparison group, the eligible but excluded households are natural comparison group for our treatment group. For an in-depth examination of other potential selection issues, please see section 4 on empirical strategy below.

approach (DID), we allow for different time trends in different districts and control for selection on observables. In particular, we use the difference-in-difference matching estimator (Heckman et. al., 1998, Todd, 2007) that combines a difference-in-difference approach with the matching technique to eliminate the time invariant unobserved heterogeneity (henceforth called DIDM approach). The evidence from the DID and DIDM approaches shows that there is significant positive effect of participation in the TUP program on net income, food security, quality of housing, household durables including tubewells and blankets, and livestock of the ultra-poor.[9] There is very weak or no evidence of any significant effect of the TUP program on subjective health outcomes, women's empowerment,[10] ownership of homestead land and stocks of other productive assets (such as a fishing net or rickshaw van). Although the estimates from the DID and DIDM approaches show a statistically significant and numerically important effect for the ultra-poor group SB_1 for a number of important outcome variables, it is not always robust to allowing for even a small amount of selection on unobservables. For example, the program impact on housing quality and some of the household durable goods noted above is not robust to allowing for low to moderate levels of selection on unobservables.

Although the estimates of the average treatment effect on treated (ATT) from the DIDM approach are useful as summary measures of the effects of the TUP program participation, they are unable to shed much light on the possible heterogeneity in the treatment effects.

[9]The DIDM approach takes care of time invariant unobserved heterogeneity, but still relies on selection on observables to defend the common time trend assumption. However, there can be time variant unobserved heterogeneity that gives rise to differential time trends across the treatment and comparison groups. We thus use the recently proposed sensitivity analysis of matching estimators to see if the estimated treatment effects can be swamped by low to moderate selection on unobservables.

[10]The indicator for women's empowerment used is the ratio of number of sari (women's clothing) to lungi (men's clothing)).

We provide some evidence of heterogeneous treatment effect of the TUP program focusing on the net income gains of the households. We analyze the TUP program impact on household's net income using the Quantile Difference-in-Difference estimator (henceforth QDID) that allows for differential treatment effects across the distribution. The results show that although, in general, strict monotonicity in the treatment effect does not hold, the income gains from program participation for the lowest two deciles is much less compared to the top two deciles of ultra-poor households.

The rest of the paper is structured as follows. Section 2 provides a brief discussion of the BRAC TUP program. The following section discusses the data and variables. Section 4 is devoted to a discussion of the empirical strategy for identification and estimation of the treatment effects in greater detail. The next section reports the estimated treatment effects of program participation on a set of household outcomes in a sequential manner starting from a simple difference-in-difference approach. The paper concludes with a summary of the findings.

2. The BRAC Ultra-poverty Program

One of the most comprehensive and innovative approaches to redressing ultra-poverty has been developed and implemented by BRAC. BRAC is the world's largest NGO by some measures (membership, scope, and budget). Founded 1972, it started microfinance in 1974, which now includes approximately seven million women members. The BRAC Education Program (BEP) serves over 1 million (10%) Bangladeshi primary students in some 35,000 informal schools. Over 110 million receive BRAC health and other services in Bangladesh. BRAC features such diverse activities as development-oriented enterprises, legal education

for the poor, a bank, a university, and an internet service provider, among others. BRAC is now expanding abroad including activities in Afghanistan, Sri Lanka, Uganda, Tanzania, and South Sudan.

TUP (phase I) was launched in three relatively poor districts in Northwest Bangladesh (Rangpur, Kurigram, and Nilphamari, identified on the basis of poverty mapping), with more than 5000 women selected from a larger group of potential participants, who together form the basis for our panel data set.[11] All members of participant and comparison groups were selected by villagers as among the poorest local families. A subset was selected by BRAC according to exclusion and inclusion criteria. The exclusion criteria required that participating women must be capable of doing work outside the home, must not belong to another NGO program and must not receive a food benefits card. In the inclusion criteria, participating women have to meet three of the following: child labor is present; ownership of less than 10 decimals of land (a tenth of an acre), lack of a male earner at home, adult women selling labor outside of the household, and lack of any productive assets (Noor et al 2004, p. ix, BRAC Annual Report 2007, P. 24).

To identify the ultra-poor women, several strategies were used. One is "Participatory Wealth Ranking" that utilizes local information available to the villagers. A meeting is held in which a village map is drawn on the ground with each household labeled. The villagers agree on a wealth ranking among the households, to identify those who are the poorest of the poor. Those who can afford tin plate walls or roofs are less poor than those with straw walls or thatched roofs. Those who are known to have a steady, formal job are categorized as among the well off. To keep the process manageable, only about 150

[11] As mentioned before, starting from the three poor districts, the first phase of the TUP program was scaled up to cover 15 districts and 100,000 households over a period of five years.

households were included in each wealth ranking exercise.

There are incentives for people to rank themselves as poor enough to receive assistance; but the multiple checks done on family status means their ability to get away with this is sharply limited. The mechanism is not perfect; better off people may find ways to convince BRAC staff that they should be counted among the poor, and conversely, those in the most extreme poverty may not come forward at all; and people may forget their small huts when drawing village maps. Or, the poorest may not be identified because they are viewed as a part of the household of distant relatives who function in a clientelistic relationship with the poor (Matin et al 2008). Indeed, the more socially excluded among the poor may be less likely to be picked–yet their social exclusion is a fundamental cause of their poverty. To supplement community meetings, BRAC staff members walk through the village, looking for any hut that gives the appearance of extreme poverty. They then try to bring potentially overlooked ultra-poor people to the attention of the community meetings. Village leaders, generally people who are relatively well educated such as the schoolteachers, had been actively involved in all stages of the process.

The TUP program works to improve the physical, human, and social capital of the poorest 20% of the population. A core activity of the program is to provide participants with a grant of specific physical assets. The TUP program then provides assistance for using the transferred assets effectively as a microenterprise. In particular, BRAC staff members offer ongoing training in specific enterprise activities notably livestock and poultry rearing, fruit, vegetable and herb cultivation, operation of tree nurseries, and village vending such as circulating around the village with a pushcart. Each training program is targeted to the specific asset transferred; periodic refresher training is offered. After enterprises are

established, microfinance and related services are eventually provided through the equivalent of BRAC's primary Village Organizations. A goal of mainstreaming these clients into microfinance is to enable them to maintain and expand their businesses over time.

The TUP program works to develop human capital through the microenterprise training, as well as general education including functional literacy, and improved health. BRAC provides the program participants (SUPs) with health services. BRAC staff including BRAC's village health volunteers known as Shastho Shebikas provide training, basic care, and referrals. BRAC staff educate the SUPs concerning health matters during special sessions, and provide point of first contact health services, referring SUPs to doctors and other health professionals when possibly significant health problems are indicated. Financial assistance for illness is provided. Direct services include child health, immunization, diarrheal disease control, vitamin A supplements for children under 5, TB control, and family planning services and pregnancy care. Yet another activity is to install sanitary latrines.

The program also seeks to build social capital through village support networks and sponsorship of community leaders for extremely poor women. The village support committees engage elites, often individuals who are known for public-spirited or religiously motivated charitable works. The committees assist the TUP participants when they are subjected to various types of shocks, such as by helping them to recover lost assets.

3. The Data and Variables Description

For the empirical analysis, we use the BRAC TUP panel data set. This is a two-year panel of about 5000 households. The baseline survey of 5626 households was done in

2002. In 2005, 5288 households were resurveyed, along with 278 newly formed households that had split from the initial set of households. Attrition was moderate and was due to migration, death, and marriage. The final matched panel contained 5067 households.

The BRAC TUP panel data set provides information on a wide range of household characteristics and outcomes. The survey contains a rich body of information regarding the asset base of the household that includes natural (land), physical, human, financial and social capital. We estimate the causal effects of program participation on income and physical assets, food security, health, and women's empowerment. Food security is measured by three indicators: food availability, grain stock, and the ability of a household to manage two meals a day. The physical assets include livestock (cow/bull, duck, hen etc.), other productive assets (such as a fishing net, rickshaw van, and "big trees" producing sticks, small lumber, fuelwood, or fruit) and household durable goods such as tubewells, blankets, beds, chairs and tables. The assets measures used as the outcomes do not include any assets transferred from the TUP program. The health indicators are subjective health status reported by the respondents. As a measure of women's empowerment we use the ratio of sari (female clothing) to lungi (male clothing). For poor households in Bangladesh this is a reasonable indicator of relative expenditure on *feminine goods* in the household. There is a large literature that uses relative expenditure on feminine goods as an indicator of female empowerment (see for example, Deaton (1989), and Strauss and Thomas (1995)).

Although our analysis covers both the flow and stock variables, one might argue that three years may not be enough to capture long term effects of the program, and thus the evidence on the stock variables should be interpreted with appropriate caveats. It is possible that our analysis underestimates of the long-run effects of program participation

on the stock variables.

The variables used for matching estimator are (at 2002 levels): gender of household head, body mass index, age of the household head, each of the inclusion criteria, a dummy for whether the main source of income was from day-labor activities, and a variable that measures the amount of land that the individual owned.

Table 1 presents the summary statistics of the relevant variables used in this paper. One can see some interesting changes from 2002 to 2005 for the sample of households in the panel. There are significant improvements for an average household from 2002 to 2005 in terms of most of the indicators including large gains in net income, food availability, housing (tin roof), livestock, and most of the assets.[12]. Somewhat surprisingly, even though food availability has increased on an average, the percentage of households that can have two meals a day declined. There is also some evidence that the ownership of homestead land has worsened on average from 2002 to 2005.

4. Empirical Strategy

For a proper analysis of the treatment effect of the TUP program, we need to construct the treatment and comparison groups carefully so that any potential selection bias can be minimized. BRAC's own treatment and comparison groups are called "selected ultra-poor" (SUP) and "nonselected ultra-poor" (NSUP). Although both the treatment group (SUP) and the comparison group (NSUP) in the BRAC panel data set are drawn from among extremely poor households identified by villagers (thus reflecting local knowledge), they are differentiated by BRAC's systematic inclusion and exclusion criteria, and may suffer

[12]This is consistent with the recent evidence that Bangladesh has achieved significant reduction in rural poverty over last two decades (see, for example, Sen and Hulme, 2006)

from other selection biases for a variety of reasons (see below). So the SUP-NSUP subsets may not be the best possible treatment and comparison groups for estimating the treatment effects, especially when the interest lies in understanding the effects of the program on the ultra-poor. We utilize errors in assignment in BRAC's selection to construct alternative treatment and comparison groups based on type 1 and type 2 errors. Based on the formal selection criteria of BRAC, we partition the sample of households in the panel data set into four subsets. They are: (i) households that are eligible according to the stated criteria and are included in the program (subset called the "should be, one" (SB_1) group henceforth), (ii) the eligible households not selected (called the "should be, zero" group (SB_0)), (iii) households ineligible according to formal criteria but selected in the program (called the "should not be, one" group (SNB_1)), and (iv) households ineligible and not selected (called the "should not be, zero" group (SNB_0)). For details on the construction of these four subsets, please see Appendix 1.

There are two levels of selection problems that we have to consider: (i) BRAC's selection process, and (ii) the participation decision by households. As discussed earlier, BRAC's selection process was based on a set of explicit inclusion and exclusion criteria. To understand the nature of potential selection bias arising from BRAC's selection process we need to have an implicit model of the actual decision making by BRAC employees. The simplest model is to assume that BRAC employees were following the set of inclusion and exclusion criteria strictly, and thus the *assignment errors* discovered in the data are either completely random or due to the fact that some eligible households declined to participate in the program. If self-selection out of the program by eligible households is important then households in group SB_0 are likely to differ systematically from eligible households

that participate in the program, i.e., SB_1. The alternative model is to assume that BRAC employees were using both the formal criteria and private signals available to them. In this case, the objective function of the BRAC employees becomes critical. If the objective was to identify the true ultra-poor, then the group of households who should have been in the program according to the set of formal criteria but were not selected (i.e., SB_0) must be relatively well off (more advantaged) in terms of initial economic conditions and characteristics in 2002. Under the alternative assumption that the objective was to identify and exclude potentially high risk households so as to help ensure the "success" of the program, then the SB_0 group is likely to be systematically more disadvantaged in 2002. The most plausible scenario, however, is that there is heterogeneity among the BRAC employees, and thus both positive and negative selections may characterize our data set. Interestingly, the evidence presented below shows that the SB_1 and SB_0 groups are, on an average, very similar in terms of initial economic characteristics in 2002. This evidence is consistent with two alternative hypotheses: (i) the positive and negative selections largely offset each other, or (ii) the private signals of BRAC employees were not important for the screening process, at least with regards to the sub-samples we are focusing on.[13]

Table 2a reports the difference in means and the associated standard errors for a set of observable characteristics in 2002 across different pairs of treatment-comparison groups. The first column gives the initial difference in means for the $SUP - NSUP$, the second for $SB_1 - SB_0$, the third for $SNB_1 - SNB_0$, and the last for $SB_1 - SNB_0$. The evidence in Table 2a clearly shows that the initial difference in the means is, in general, much lower for the treatment-comparison pair $SB_1 - SB_0$. In contrast, there are some significant and

[13]In addition, some of the eligible households might have been excluded to create a proper comparison group, a possibility mentioned before.

relatively large differences in the initial conditions in 2002 between the treatment and comparison groups as defined by BRAC (i.e., the subsets SUP and $NSUP$) and used by BRAC's Research and Evaluation Division (RED) in its "descriptive analysis" of the TUP program (Rabbani, Prakash, and Sulaiman, 2006). This confirms the possibility that the NSUP may not be an appropriate comparison group for the treatment group SUP. Consider for example, the variable "change in net income over the last year" in the first row. The differences in means are: $Tk.162$ $(SB_1 - SB_0)$, $Tk.1924$ $(SUP - NSUP)$, $Tk.1362$ $(SNB_1 - SNB_0)$, and $Tk.5289$ $(SB_1 - SNB_0)$. It is interesting that the subsamples $SB_1$and SB_0 look much more similar according to the observable characteristics reported in Table 2a. Since selection on observables and selection on unobservables are likely to be related (a point emphasized recently by Altonji et. al. (2005)), SB_0 constitutes an appropriate comparison group to estimate the treatment effect when the treatment group is SB_1. The fact that the groups SB_1 and SB_0 look similar to each other is, however, not consistent with the hypothesis that BRAC employees were systematically excluding specific types of households from the set of eligible households.[14] This evidence also does not lend support to the hypothesis that the SB_0 households self-selected out of the program because they are very different types of households compared with the eligible participants (i.e., SB_1 households).[15] Note that the treatment group SB_1 and the comparison group SNB_0 satisfy the BRAC inclusion and exclusion criteria perfectly. The difference in means in 2002 between these two groups is much more pronounced than the differences across SUP

[14]Note that although BRAC employees may have more information, some of the most important individual characteristics like ability are unobservable to both BRAC employees and the econometrician.

[15]It is possible, at least in theory, that the selection is dominated by unobservable characteristics. We implement sensitivity tests for the DIDM results to see if the estimated treatment effects can be driven by selection on unobservables (see Table 5 below).

and NSUP (see Table 2a).

The evidence also indicates that there are important differences in the initial conditions across the three different treatment groups. Table 2b reports the group averages of a set of variables in 2002 across the groups. Although the groups are similarly situated according to some observables like food availability, and quality of houses as indicated by the roof made of tin, the SB_1 group is clearly the poorest among them. While the percentage of households who own their homestead land is 39 percent for the SB_1 group, the corresponding numbers for SUP and SNB_1 are 47 percent and 53 percent respectively. The increase in net income from 2001-2002 was $Tk.5860$ for an average SB_1 household, $Tk.8150$ for SUP, and $Tk.9787$ for SNB_1. This implies that if one is interested in understanding the treatment effect of the TUP program on the poorest of the poor, SB_1 is the most appropriate treatment group to focus on with the appropriate comparison group SB_0. Given the above analysis, our focus is on the estimates of treatment effects (ATT) from the combination of SB_1 (treatment) and SB_0 (comparison). As a benchmark, we also report the estimates from BRAC's own classification (i.e., SUP (treatment) and $NSUP$ (comparison)). However, one should interpret the estimated treatment effects on SUP with appropriate caution, as selection bias can be important in this case given the difference in initial characteristics between the SUP and $NSUP$ in 2002. We do not report or discuss the treatment effect estimates for the treatment group SNB_1 as it is composed of relatively richer households, and thus clearly not the target group of the TUP program. The results are, however, available from the authors.[16]

To estimate the treatment effect using the alternative treatment-comparison groups as

[16]The caveat about selection bias discussed for the SUP group applies equally for this group.

discussed above, we use difference in difference (DID) with and without differential time trends in different districts (i.e., Rangpur, Kurigram, and Nilphamari). Moreover, additional controls are included in the DID regressions which might affect both the treatment decision and the outcome variables to account for possible selection on observables. We also combine the difference-in-difference approach with matching (the DIDM estimator). As mentioned earlier, the DIDM approach purges any time invariant heterogeneity at the individual level by time differencing; and then matching takes care of selection on observables in a flexible way without imposing any particular functional form. This, however, does not address the possibility that the estimated treatment effect may be contaminated by selection on unobservables that vary over time and thus may result in differential time trends across treatment and comparison groups. We implement sensitivity analysis for the DIDM results to see if the estimated treatment effects can be driven by reasonable magnitudes of selection on time varying unobservable factors.

There has been a growing appreciation in the recent literature that treatment effects are, in general, heterogeneous in a non-trivial way (Ravallion, 2007, Heckman, et. al. 1998). We implement a quantile difference in difference approach (QDID) to provide some evidence on heterogeneity in the treatment effects focusing on income as the outcome. We report results from the alternative specifications of the QDID: common time trends, differential time trends in different districts, and also with and without additional controls to take into account selection on observables.

5.Treatment Effects (ATT) of the TUP Program

(5.1) Results from the Difference-in-Difference Approach

In this section, we report the estimated treatment effects on a set of household outcomes including income, assets, and health related indicators using alternative specifications of the difference-in-difference approach. The standard difference-in-difference specification is based on the following model of the treatment effect:

$$Y_{it} = \alpha_0 + \alpha_1 d_{05} + \alpha_2 d_T + \beta \ (d_T * d_{05}) + \epsilon_{it} \tag{1}$$

where Y_{it} is the outcome variable of interest for household i in year t, d_{05} is a dummy that equals 1 for the year 2005, and d_T is a dummy that equals 1 when household i belongs to an appropriately defined treatment group (i.e., SB_1, SUP, SNB_1) and equals zero when a household belongs to the corresponding comparison group (i.e., $SB_0, NSUP, SNB_0$). The parameter of interest is β, which isolates the treatment effect on outcome Y under certain assumptions. The crucial difference-in-difference estimation assumption is that the treatment and comparison groups would follow the same trend in the absence of the program. If this assumption is not satisfied, the estimate of the treatment effect $\hat{\beta}$ will be biased when we use OLS to estimate equation (1). We augment the basic DID specification in two ways to make it more plausible that the counterfactual trend for the treatment group is well represented by the actual trend in the comparison group. First, we allow for differential time trends in the different districts in our data set. This leads to the following specification:

$$Y_{it} = \alpha_0 + \alpha_1 d_{05} + \alpha_{1R} (d_{05} * d_R) + \alpha_{1K} (d_{05} * d_K) + \alpha_2 d_T + \beta \ (d_T * d_{05}) + \epsilon_{it} \tag{2}$$

where d_R and d_K are dummies for Rangpur and Kurigram districts respectively.[17] This is relevant because evidence reported in Sen and Hulme (2005) indicates that a measure of human poverty fell in the 1995-2000 period by 3.57% in Nilphamari, but only 1.73% in Kurigram and 1.65% in Rangpur. In addition, we allow for the possibility that the trends might differ across households with different observable characteristics. Thus, we also control for a set of observables that are likely to be important for selection into the treatment (either because of BRAC's criteria, or the household's own outside option). Controlling for selection on observables results in the following specification of the DID regression:

$$Y_{it} = \alpha_0 + \alpha_1 d_{05} + \alpha_{1R}\left(d_{05} * d_R\right) + \alpha_{1K}\left(d_{05} * d_K\right) + \alpha_2 d_T + X_{02}^{'}\Pi + \beta\ \left(d_T * d_{05}\right) + \epsilon_{it} \quad (3)$$

where X_{02} is the set of controls in 2002 added to equation (2) above.[18]

Table 3a presents the estimated treatment effect from specifications (1)-(3) for both our and BRAC's treatment-comparison pairs, (SB_1 and SB_0) and (SUP and $NSUP$) respectively. For binary outcome variables such as food availability or homestead ownership, we report the estimates from probit regressions, although the estimates from linear probability models are, in general, very similar.[19] A few general patterns emerge from the estimates reported in Table 3a. Although the magnitudes of the estimated treatment effects vary across different specifications of the difference-in-difference regression, in general they fall

[17]The omitted district is thus Nilphamari.

[18]The set of variables used to control for selection on observables is discussed in detail in the following section where the results from the DIDM approach are presented.

[19]The estimates for "food availability" are somewhat different in terms of their numerical magnitude when we use a linear probability model. However, the main conclusions of the paper remain intact irrespective of the estimation method. The linear probability estimates are available from the authors.

within tight bounds (an exception is the 'change in net income'). The estimates of the treatment effect vary a little more across the treatment-comparison pairs. Although the difference in the magnitude is in general small, the estimates from the BRAC classification ($SUP-NSUP$) and our preferred classification (SB_1-SB_0) differ significantly for some of the of the most important outcomes (for example, change in net income and grain stock). It is important to appreciate that the broad similarity in terms of absolute magnitudes of the treatment effect across the treatment groups can be misleading as the households in the SB_1 group may start from a much lower initial condition in 2002 in terms of a given indicator like 'change in net income' and assets.[20] The treatment effect is substantially higher for the SB_1 group relative to SUP when we normalize by the mean in 2002 for different groups for such outcomes (reported in Table 3b). The results in Tables 3a-3b indicate that TUP program participation has had significant positive effects on a number of important household outcomes including net income, food security, livestock, and durable goods such as blankets and tubewells, especially for the target group, i.e., the participating households that satisfy the BRAC selection criteria (SB_1). In contrast, there is no significant effect on any of the health related indicators, other productive assets (such as fishing nets, rickshaw/van), or on ownership of homestead land.

We now turn to the details of the results. Considering first the impact on 'change in reported income over the last year', income gains are consistently higher for the participants in the TUP program across all three different specifications of DID for both SB_1 and SUP. The estimates for our preferred treatment group SB_1 show that controlling for observable

[20]We emphasize again that this comparison between SB_1 and SUP may not be appropriate as the treatment effect estimates for SUP may suffer significantly from selection bias given that the comparison group NSUP differs substantially in terms of 2002 characteristics. But we use the SUP results as the relevant benchmark as this is the treatment group used by BRAC.

characteristics substantially reduces the estimate of the treatment effect while allowing for a differential time trend does not have any appreciable effect. The estimate from the most general specification of DID shows a higher impact of the program on the SB_1 group ($Tk.3131$) compared to the BRAC treatment group SUP ($Tk.2941$). When expressed as percentage of the group mean in 2002, the treatment effect for SB_1 (53 percent) is much higher than that for SUP (36 percent) (see Table 3b).

Failing to own the land on which ones house is located is a basic determinant (and indicator) of lacking even the most minimal wealth and security. The houses of participants are generally little more than one room shacks, so lack of ownership of these tiny plots is a signal of extreme poverty, insecurity, and general vulnerability. The estimates show a weak program impact on this outcome variable. There is a small but statistically significant effect according to the simple DID and DID with differential time trend estimates. However, once we control for observable characteristics, the impact is reduced more and becomes statistically insignificant at the 10 percent level for the SB_1, although the effect remains significant for the BRAC treatment group SUP. An interpretation is that conclusions based on the SUP group would have been misleading in this case if one is interested in understanding the program impact on the ultra-poor. A related outcome variable is tin material for roofs, a positive indicator of the overall housing quality in rural Bangladesh. Interestingly, there is a significant program impact irrespective of DID specifications for both SB_1 and SUP groups. Also, the magnitude of the program effect does not vary significantly between the SB_1 and SUP groups (see Tables 3a and 3b).

We now turn our attention to a set of asset variables, broadly classified as livestock (number of cow/bulls, goat/sheep, duck/hens), productive assets (number of fishing nets,

big trees, kg of grain, number of rickshaws/vans and bicycles), and household durable goods (number of chair/tables, beds, radio/TVs, quilt/blankets, and tubewells).[21] With respect to livestock [22], tubewells and quilts/blankets, there is a strong positive impact on the ultra-poor group SB_1. Similar effects are also found for the BRAC treatment group. The differences in the magnitudes of the treatment effects are, in general, not large between SUP and SB_1, and they do not reveal any clear pattern. However, when we consider the normalized treatment effects, the SB_1 group is the one with the higher impact for all livestock assets (see Table 3b).

The evidence on the stock of other productive assets for SB_1 shows that there is, in general, no significant program impact once we control for the observables (see column (3)). If we focus on the most general specification of the DID, for 'big tree' there is strong positive impact of the program on the BRAC treatment group SUP, but no impact on SB_1. One would thus arrive at a wrong conclusion regarding the program effect on the ultra-poor if SUP is used as the treatment group instead of SB_1. Curiously, there is a statistically significant negative effect of the TUP program on the number of bicycles in a household for the SB_1 group, although the effect is numerically small.

For household durable goods, except for radio/TV, the impact of TUP program participation is statistically significant and similar across different treatment groups and DID specifications. The magnitudes of the the treatment effects from the most general specification of DID are slightly higher for SB_1 except for the case of number of beds a household

[21]The DID equations for the asset variables reported in Table 3.a are estimated by OLS. The pattern of the treatment effect does not change if we instead look at the net change in the stock of a given asset from 2002 to 2005 and estimate a binary model (probit) distinguishing between positive and non-positive changes.

[22]These are considered as savings by the TUP, and the program did not provide them.

owns. The normalized program effects preserve this pattern of relative magnitudes (see Table 3b).

Perhaps the most important impacts in terms of human welfare were found in alleviating the problem of food insecurity. We use three indicators of food security: 'food availability', grain stock, and 'ability to obtain two meals a day', as reported in Tables 3a-3b. The estimates show strong evidence of a significant positive impact of TUP participation on food security across both the treatment groups. If we focus on the most general specification of the DID, the treatment effects are similar for SUP and SB_1 for two of the food security indicators (food availability and two meals a day), while the impact on grain stock is much higher for the treatment group SB_1. It is interesting that the estimates for food availability and grain stock in the case of the BRAC treatment group SUP are affected in a significant way when we control for observable characteristics. This can be interpreted as evidence that selection on observables is especially important for the SUP group with regards to these particular food security outcomes.

Next, consider the survey questions on self-reported subjective health status and health improvement over last year. The estimated treatment effects are numerically small across the board and not significant at 5 percent level. We thus do not find any evidence of any significant effect of TUP program participation on the subjective health outcomes. Although this might reflect the fact that health improvements take time and may be subject to threshold effects, the evidence should be interpreted with additional caveats. The reported health indicators may have significant measurement error or reporting bias, in part due to its subjective nature, and in part because better health training, as provided in the program, can lead to increased awareness of participants' conditions as health problems.

This effect would bias downward responses from actual improvements.

An indicator of basic wellbeing for women in Bangladesh is the number of saris (dresses) a woman owns. Following the literature, this can also be viewed as an indicator of a woman's bargaining power in the household.[23] It is interesting that the treatment effect is significant both numerically and statistically across treatment groups and DID specifications. The normalized treatment effects are also similar (see Table 3b).

The evidence on number of saris discussed above is, however, a noisy indicator of a woman's bargaining power at best. Even if there is no change in the bargaining power of women due to participation in the TUP program, the number of saris a woman owns may be higher because of an income effect reflecting higher income gains discussed earlier. A better indicator of women's household bargaining power is the ratio of saris (dresses) to lungis (male clothing). The estimates in Table 3a show that there is a significant effect of TUP program participation on the ratio of saris to lungis for the BRAC treatment group SUP, but no statistically significant effect for the treatment group of interest, i.e., SB_1 group when controlling for observable characteristics.

Possessing sandals/shoes is important not only to protect feet from cuts but also to prevent other infections including parasites, and to improve speed and flexibility of movement in an environment in which the poor largely travel on foot. A significant and substantial positive effect is found when looking at the key SB_1 group. The result also holds for the SUP households comparison. The numerical magnitude of the treatment effect is slightly smaller for SB_1 compared with SUP, both in terms of absolute and normalized treatment effects (see Tables 3a and 3b).

[23]There is now a large literature that interprets expenditure on feminine goods as an indicator of women's intra-household bargaining power. See, for example, Deaton (1989).

(5.2) Difference-in-Difference Matching Approach (DIDM)

The estimates reported in Tables 3a and 3b and discussed in the preceding section provide us with robust evidence on the treatment effect of TUP program participation. The results, however, rely on two restrictive assumptions: (i) the selection on observables is adequately controlled for by the postulated linear effects of the variables included in the DID regressions (i.e., the vector X_{02}), and (ii) selection on unobservables is not strong enough to dominate the estimated treatment effects. However, as widely discussed in the literature, both of these assumptions may not be tenable in many applications. The DIDM approach gets around the first problem by using matching techniques to control for selection on observables. As mentioned earlier, the DIDM approach still relies on selection on observables for identification and thus assumes implicitly that the degree of selection on unobservables is not significant. In this section, we first report the estimated treatment effects from the DIDM approach and then provide evidence on the importance of selection on unobservables using sensitivity analysis.

A critical step in implementing the DIDM approach is to choose an appropriate set of observable characteristics that are likely to be important in determining the selection into treatment and may also affect the outcome variables. As discussed before, we need to consider two levels of selection: BRAC's selection process and also the participation decisions of the households. We thus use observables that reflect these two levels of selection problems for matching. To account for the BRAC selection process we use the set of inclusion criteria. We also include indicators of a household's physical and human capital (for example, land owned, household size, BMI and age of the household head, and an indicator of women working as day laborers). As emphasized recently by Emran, Morshed

and Stiglitz (2007), and Emran, Shilpi, and Stiglitz (2008), the outside option of a household and thus the net return they get from participation in the TUP or other NGO programs depends on the nature of labor market interactions and the shadow value of labor, especially of women's labor. We thus include household size as an indicator of labor endowment of the household, and the variable "day labor" as a measure of labor market participation by women. We also include "land owned," as it is a crucial variable for the determination of the shadow price of labor and also whether a woman is excluded from critical markets such as the formal credit market and the labor market. All of the matching variables are from the 2002 baseline survey.

Table 4a reports the estimated treatment effects from the DIDM estimator; and the corresponding normalized treatment effects are reported in Table 4b. The results are, in general, consistent with the conclusions reached above on the basis of the DID approach. The estimated treatment effects vary depending on the matching algorithm used, but they are, in general, confined within reasonably tight bounds. For example, consider the estimated treatment effect on food security as measured by "food availability" and able to take "two meals a day". The intervals of the estimated treatment effects in the case of the SB_1 treatment group are [0.26, 0.27] and [0.40, 0.41] for food availability and two meals a day respectively. The estimate from the general DID regression is 0.24 (food availability) and 0.42 (two meals a day). The corresponding intervals in case of the treatment group SUP are [0.25, 0.26] and [0.38, 0.40] respectively, while the estimates from the general DID are 0.25 and 0.42. Interestingly, the estimated treatment effect on grain stock is somewhat larger and statistically more significant according to the DIDM approach compared to the DID estimates if we focus on the most general specification. With respect to the asset

variables, the estimates from DIDM are roughly the same as those from DID regressions. The DIDM results, however, contradict the earlier conclusion that for the SUP treatment group, there is significant positive effect of program participation on the ratio of saris to lungis which can be viewed as an indicator of women's relative bargaining power within the household. Along the same lines, the DIDM estimator shows no significant effect (both numerically and statistically) on ownership of homestead land, which was about [0.08, 0.10] in the general DID regression.

(5.3) How Does Selection on Unobservables Affect the Results? Evidence from Sensitivity Analysis

The evidence presented above in Tables 3a-3b, and 4a-4b does not take into account the implications of potential selection on time variying unobservables for the estimated treatment effects. In this section, we present Rosenbaum bounds on the estimated treatment effects to provide evidence on the importance of selection on unobservables using the methodology developed by Aakvik (2001), DiPrete and Gangl (2004) and Becker and Caliendo (2007). Table 5 presents the results from the sensitivity analysis for key outcome variables. We concentrate on the outcome variables that indicate significant program effects according to the DIDM estimates in Table 4a. For the binary outcome variables, we present Mantel-Haenszel statistics (see Becker and Caliendo (2007) for details). There are two test statistics: $Q_m h^+$ is the Mantel-Haenszel statistic under the assumption that the estimated treatment effect is overestimated (relevant when the expected treatment effect is positive), and $Q_m h^-$ under the assumption that the estimated treatment effect is underestimated (relevant when the expected treatment effect is negative). In the context of our

analysis, the worry is that the positive treatment effects reported in Tables 3a and 4a may be spurious because of upward bias if there is positive selection on unobservables. So we report only the $Q_m h^+$ statistic and the associated P-values $P_m h^+$ in Table 5. For continuous outcome variables, we present Wilcoxon signrank tests that give the upper and lower bounds on significance of the treatment effects for a given level of selection on unobservables (i.e., hidden bias). The results show that the estimated program impact on net income and food security (food availability, grain stock and "two meals a day") are robust to allowing for a significant level of selection on unobservables irrespective of the treatment group. This can be seen from the P-values of the relevant Mantel-Haenszel statistics (i.e., the $P_m h^+$) for different levels of selection on unobservables represented by different values of Gamma. For example, when the odds of participation is 50 percent higher (i.e., Gamma=1.50) for the treatment group,[24] the $P_m h^+$ is 0.01 or less for net income, food availability and two meals a day for both the treatment groups providing strong evidence that the estimated treatment effects cannot be driven by selection on unobservables. In case of grain stocks, the program impact for SB_1 stays significant at 5 percent level at Gamma=1.30. For some outcome variables such as number of saris and having a roof made of tin, the program impact becomes insignificant for the ultra-poor group (SB_1) in the presence of even a small amount of selection on unobservables, although the estimated program effects survive for the BRAC treatment group SUP.[25]

For the sensitivity analysis for the asset outcome variables, we use a dummy variable

[24]This implies unusually strong selection on unobservables.

[25]We note the caveat that this cannot be taken as definitive evidence against a program impact on the SB_1, as we have no way to determine if there is actually significant selection on unobservables. One can interpret this evidence as implying that even if there is a low degree of selection on unobservables for the SB_1 group, then the evidence in favor of a program impact is not strong.

that equals one when the change in the stock of assets at the end of the period is strictly positive (i.e., 2005-2002). We then present the relevant Mantel-Haenszel statistics. For the number of cow/bulls, goat/sheep, and quilts/blankets, the estimated program effects survive when we allow for very strong selection on unobservables (Gamma=2.0) for the ultra-poor group SB_1 and also for the BRAC treatment group SUP. Moreover, the change in number of tubewells survive even if there is significant selection on unobservables for both the SUP and SB_1 groups (when Gamma=1.30, significant at 1 percent for SB_1 and at 3 percent for SUP). The change in fishnets, big trees, rickshaws, bicycles, chair/tables, beds and radio/TV become insignificant with a small amount of selection on unobservables.

(5.4) Heterogeneity in the Treatment Effects on Income

Table 6 reports the results from estimating the DID specifications (1)-(3) in the text using quantile regressions focusing on household net income. This gives us a way to provide some evidence on possible variations in the treatment effects on income across the distribution.[26] There are plausible theoretical reasons to expect that households who start at lower initial conditions may benefit less from the TUP program participation, at least in absolute terms. In principle this can be due to threshold effects and the myriad of interlocking constraints that create and sustain poverty traps for the poorest of the poor. If, on the other hand, one entertains a standard "neoclassical" view with concave production functions satisfying the Inada conditions, we would expect that the poorest of the poor would benefit the most (i.e., the conditional convergence across households).

The estimated treatment effects on the outcome variable 'change in net income over

[26]QDID has been used recently by Song and Manchester (2007), among others.

the last year' by QDID are reported in Table 6 for three different specifications of the DID model used in Table 3a for both SB_1 and SUP groups. The most striking conclusion that holds across the board is that the income gains from the TUP program participation is much less for the households in the bottom two deciles compared to the households in the top two deciles of the distribution. Also, according to the estimates, the treatment effect is not statistically significant for the households in the lowest decile for both the SB_1 and SUP, which reinforces the conclusion that the poorest of the ultra-poor seems to be facing additional constraints. A second interesting pattern is that the magnitude of the program effect goes down across the distribution when we control for selection on observables, and the role of the observable characteristics seems to be stronger for the households in the lower tail of the distribution.

Conclusions:

Using a two-period household level panel data set, this paper provides robust evidence on the effects of the first phase of the TUP program in Bangladesh on a set of important household outcomes for the ultra-poor. We use the errors in assignment in BRAC's selection to create alternative treatment and comparison groups. This allows us to identify a treatment group composed of the poorest of the poor (i.e., ultra-poor) among the sample households and also an appropriate comparison group for the treatment group. A rich set of econometric approaches are used to estimate the average treatment effect on treated (ATT) that takes into account both 'selection on observables' and 'selection on unobservables'. The results show that there is significant impact of program participation on net income, food security, ownership of livestock and household durables such as tubewells and

blankets/quilts of the ultra-poor households. The evidence also indicates that the TUP program may not have any significant effects on health related outcomes, women's empowerment as measured by the ratio of saris (women's dress) to lungis (male clothing), and on the ownership of homestead land and other productive assets examined such as fishing nets and rickshaw/van. The estimates from the quantile difference in difference approach show that the lowest two deciles of ultra-poor households reap much lower income gains compared with the households in the top two deciles. To the best of our knowledge, this is the first analysis of the treatment effects of the widely acclaimed TUP program in Bangladesh with careful considerations of selection issues; and we provide robust evidence on its effects on ultra-poor households.

Appendix 1: Creating Variables for the Errors in Assignment Analysis

Initial eligibility for people living in poverty to join the program is based upon selection at a meeting of the village, which designates individuals in the lower two socioeconomic strata; but among those selected as potentially eligible ultra-poor by the village, the NGO then selects participants according to three exclusion criteria and the presence of at least 3 out of 5 inclusion criteria (Noor et al 2004, p. ix, BRAC Annual Report 2007). The exclusion criteria are ECI (the individual is not a member of another NGO), EC2 (the individual is not a recipient of a government welfare food distribution program, and EC3 (there is no female able to work in the household. We created our own designation of those eligible using the survey data. To do so for the case of NGO membership we used

the responses to: i) whether the person had NGO savings (variable "ngos" - selected 340 observations); ii) whether the person had a loan from an NGO (variable "ngoln" - selected 64 observations); iii) whether the materials for the house wall and roof were provided by an NGO – tins1=3, (selected 32 observations); iv) whether the source of a loan was from an NGO (variable srln – selected 1 observation), and v) whether the individual was recorded as either a member of the BRAC Development Program or indicated as a member of more than one NGO (selecting 100 and 23 observations respectively). This classification selected 447 observations for the year 2002, of which 57 had been selected as SUP members for the program despite apparent ineligibility.

Exclusion criterion 2 was composed of the following variables: i) whether the person had government benefits (gprben1=2), which selected 30 observations; ii) whether main source of income was government benefits, in main source of income, for three primary sources (variables msoi1, msoi2, msoi3), which selected 3, 11 and 7 observations respectively. This classification selected 127 observations, of which 38 had been selected as SUP members for the program.

To create EC3 we used the variable disab1, those women who presented a disability. This selected 48 observations, of which 24 previously had been selected as SUP members. Overall, according to the exclusion criteria, we identified 116 participants who were selected despite being ineligible.

With respect to the inclusion criteria, the household had to meet at least three out of five conditions in order to be considered for the TUP program. They were: IC1: owning less than 10 decimals of land (a tenth of an acre), including homestead; IC2: no male income earner at home; IC3 children of school-age working; IC4: adult women of household selling

labor outside homestead; and IC5: household having no productive assets.

With respect to the first inclusion criterion (ownership of less than 10 decimals of land, including for their homestead), we created a dummy variable for whether the household owns self cultivated land, own lands that others cultivate, own homestead land, or owns land that is uncultivated. This criterion selects (as eligible) 4624 out of the 5067 for the year 2002.

For the second inclusion criterion, no male income earner present at home, we first created a dummy variable for the presence of no male income earner at home, as the intersection of males of working age (more than 14 years old) that are not working. There are 66 observations that fulfill this criterion, of which 27 already had been selected as SUP. The second auxiliary variable constructed was a dummy for the presence of no male at home (additional to the previous one, no male earner). This variable selects 1893 observations, of which 1147 had been selected for SUP participation.

For the third inclusion variable, that school-age children are working, we used questionnaire data to that effect, which selected 167 observations, of which 81 had been selected as an SUP.

To parallel the fourth inclusion criterion, that there are adult women selling labor outside the homestead, we selected those observations for which the main source of income (for the first three primary occupations) were: 5 =daylabor (agriculture), 6=daylabor (non-agriculture), 7=small business/trading, 9=begging, 10=servant, 11=professional. This selected 1627 observations, of which 1047 had been already selected as SUP.

For the fifth inclusion criterion that the household had no productive assets, we used the dummy variable "prodasst", which selected 2791 observations, of which 1614 were already

SUP members.

Finally, to construct the inclusion criteria, we consider those observations that fulfill at least three out of the five conditions. According to these data, there were 1760 observations that should have been classified as SUP, of which 647 were not.

According to the exclusion and inclusion criteria, we have created the following groups: SB_1 (selected as SUP, and fulfilling both inclusion and exclusion criteria, 994 households), SB_0 (not selected as SUP, but fulfilling criteria, 575 households) SNB_1 (selected as SUP, not fulfilling the criteria, 1381 households), and SNB_0 (correctly not selected as SUP, criteria not met, 2117 households).

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Table 1: Descriptive statistics

Variable	Year	Mean	Std. Dev.	N
Increase in net income	2002	9170.852	7899.869	5067
	2005	16279.711	10845.05	5067
Own homestead land	2002	0.543	0.498	5067
	2005	0.528	0.499	5067
Roof made of tin	2002	0.353	0.478	5067
	2005	0.614	0.487	5067
Number of cow/bulls	2002	0.114	0.513	5067
	2005	0.945	1.208	5067
Number of goat/sheep	2002	0.114	0.486	5067
	2005	0.344	0.973	5067
Number of duck/hens	2002	1.147	2.833	5067
	2005	2.526	3.687	5067
Number of fishing nets	2002	0.002	0.054	5067
	2005	0.150	0.603	5067
Number of big trees	2002	0.891	5.971	5067
	2005	0.610	2.760	5067
Number of rickshaw/vans	2002	0.031	0.271	5067
	2005	0.075	0.278	5067
Number of bicycles	2002	0.006	0.079	5067
	2005	0.017	0.148	5067
Number of chair/tables	2002	0.368	0.8	5067
	2005	0.646	1.051	5067
Number of beds	2002	0.883	0.726	5067
	2005	1.138	0.764	5067
Number of radio/TVs	2002	0.014	0.12	5067
	2005	0.03	0.176	5067
Number of quilt/blankets	2002	0.033	0.214	5067
	2005	0.161	0.444	5067
Number of tubewells	2002	0.027	0.163	5067
	2005	0.451	0.498	5067
Food availability	2002	0.059	0.235	5067
	2005	0.238	0.426	5067
Meals twice a day	2002	0.601	0.49	5067
	2005	0.403	0.491	5067
Grain stocks (kg)	2002	0.000	0.000	5067
	2005	1.661	17.824	5067
Health status	2002	0.423	0.494	5067
	2005	0.551	0.497	5067
Health improvement	2002	0.495	0.500	5067
	2005	0.629	0.483	5067
Number of saris	2002	1.811	0.588	5067
	2005	2.210	0.820	5067
Ratio sari lungi	2002	1.109	0.427	3627
	2005	1.025	0.358	3514
Do you have shoes?	2002	0.624	0.485	5067
	2005	0.898	0.302	5067

Increase in net income: Summary variable to the answer of "Last year employment and income related information - Increased net income/asset in tk" for the TUP member. **Own homestead land:** Dummy variable that equals 1 if the HH owns homestead land. **Roof made of tin:** Dummy variable that equals 1 if the material of household main living room is tin. **Food availability:** Dummy variable that equals 1 one the answer to the following question is 3 or 4: What would you say the status of your HH is in terms of food availability? Always deficit[1], deficit some times [2], neither deficit nor surplus [3], food surplus [4]. **Meals twice a day:** Dummy variable equal to 1 when the answer to the following question is yes: Could your HH afford two meals per day most of the time during last year? **Health status:** Dummy variable that equals 1 if the answer is 1 to 3: How do you perceive your current health status? Excellent [1], Very good [2], Good [3], Fair [4], Poor/Bad [5]. **Health improvement:** Dummy variable that equals 1 if the answer to the following question is 1 to 3: How do you consider your health compared to last year? Much better than one year ago [1]; somewhat better now [2]; about the same [3], somewhat worse [4]; much worse [5]. **Do you have shoes?** Answer to the question "Do all HH members have shoes/sandals?" yes[1] no[0].

Table 2a: Test of difference in mean characteristics between treatment and control groups in 2002

	$sb_1 - sb_0$	$sup - nsup$	$snb_1 - snb_0$	$sb_1 - snb_0$
Increase in net income	162.88***	1924.30***	1362.89**	5289.85***
	(247.30)	(221.40)	(296.29)	(289.00)
Own homestead land	0.09***	0.14***	0.12***	0.26***
	(0.03)	(0.01)	(0.02)	(0.02)
Roof made of tin	0.05***	0.09***	0.09***	0.11***
	(0.02)	(0.01)	(0.02)	(0.02)
Number of cow/bulls	0.05***	0.09***	0.09***	0.11***
	(0.02)	(0.01)	(0.02)	(0.02)
Number of goat/sheeps	0.01	0.04***	0.03**	0.09***
	(0.02)	(0.01)	(0.02)	(0.02)
Number of duck/hens	0.05	0.57***	0.66***	0.88***
	(0.10)	(0.08)	(0.11)	(0.12)
Number of fishing nets	0.00	0.00	-0.01	0.00*
	(0.00)	(0.00)	(0.00)	(0.00)
Number of big trees	0.27***	0.74***	0.82***	1.02***
	(0.12)	(0.17)	(0.24)	(0.28)
Number of rickshaw/vans	-0.01	0.03***	0.04***	0.04***
	(0.02)	(0.01)	(0.01)	(0.01)
Number of bicycles	0.01	0.01***	0.01**	0.01***
	(0.00)	(0.00)	(0.01)	(0.00)
Number of chair/tables	0.11***	0.31***	0.33***	0.45***
	(0.03)	(0.02)	(0.03)	(0.03)
Number of beds	0.12***	0.26***	0.29***	0.50***
	(0.02)	(0.02)	(0.04)	(0.03)
Number of radio/TVs	0.00	0.01***	0.01**	0.02***
	(0.00)	(0.00)	(0.00)	(0.01)
Number of quilt/blankets	0.00	0.03***	0.04***	0.04***
	(0.01)	(0.01)	(0.01)	(0.01)
Number of tubewells	0.01	0.02***	0.03***	0.02***
	(0.01)	(0.00)	(0.00)	(0.01)
Food availability	0.02**	0.07***	0.07***	0.08***
	(0.01)	(0.01)	(0.01)	(0.01)
Meals twice a day	0.13***	0.18***	0.18***	0.22***
	(0.03)	(0.01)	(0.02)	(0.02)
Grain stocks (kg)	0.00	0.00	0.00	0.00
	0.00	0.00	0.00	0.00
Health status	0.00	0.01	-0.02	0.09***
	(0.03)	(0.01)	(0.02)	(0.02)
Health improvement	-0.06**	-0.01	-0.02	0.07***
	(0.03)	(0.01)	(0.02)	(0.02)
Number of saris	0.06**	0.15***	0.16***	0.22***
	(0.03)	(0.02)	(0.02)	(0.02)
Ratio saris/lungis	-0.01	0.01	0.01	0.02
	(0.04)	(0.01)	(0.01)	(0.03)
Do you have shoes?	0.07**	0.11***	0.13***	0.10***
	(0.03)	(0.01)	(0.02)	(0.02)
Body mass index	0.04	0.14	0.27	0.58***
	(0.16)	(0.14)	(0.38)	(0.22)
Household size	-0.03	0.24***	-0.10**	1.50***
	(0.08)	(0.05)	(0.05)	(0.06)
Working	-0.05***	0.02***	0.01	0.01
	(0.01)	(0.00)	(0.01)	(0.01)
Age	3.89	-0.25	-0.49	-3.92***
	(0.69)	(0.36)	(0.43)	(0.48)
Can you read and	0.00	0.05***	0.04***	0.09***
write a letter?	(0.01)	(0.01)	(0.01)	(0.01)
Average years of schooling	-0.02	0.08***	0.09***	0.15***
in the household	(0.04)	(0.02)	(0.02)	(0.03)

Standard errors in parentheses

$***p < 0.01, **p < 0.05, *p < 0.1$

Table 2b: Mean values of outcome variables in 2002 for different treatment groups

	sb_1	sup	snb_1
Increase in net income	5860.19	8150.42	9787.95
Own homestead land	0.39	0.47	0.53
Roof made of tin	0.30	0.31	0.32
Number of cow/bulls	0.01	0.04	0.05
Number of goat/sheeps	0.06	0.09	0.12
Number of duck/hens	0.71	0.84	0.93
Number of fishing nets	0.00	0.00	0.00
Number of big trees	0.38	0.50	0.58
Number of rickshaw/vans	0.02	0.02	0.02
Number of bicycles	0.00	0.00	0.00
Number of chair/tables	0.14	0.21	0.25
Number of beds	0.69	0.74	0.78
Number of radio/TVs	0.00	0.01	0.01
Number of quilt/blankets	0.01	0.02	0.02
Number of tubewells	0.02	0.01	0.01
Food availability	0.02	0.02	0.03
Meals twice a day	0.48	0.51	0.52
Grain stocks (kg)	0.00	0.00	0.00
Health status	0.35	0.42	0.47
Health improvement	0.45	0.50	0.54
Number of saris	1.69	1.73	1.76
Ratio saris/lungis	1.10	1.11	1.11
Do you have shoes?	0.58	0.57	0.55

Table 3a: Impact of program on each treatment group and for each outcome

(1): $Y_{it} = a_0 + a_1 * d_{05} + a_2 * d_T + \beta(d_T * d_{05}) + e_{it}$

(2): $Y_{it} = a_0 + a_1 * d_{05} + a_{1R} * (d_{05} * d_R) + a_{1K} * (d_{05} * d_K) + a_2 * d_T + \beta(d_T * d_{05}) + e_{it}$

(3): $Y_{it} = a_0 + a_1 * d_{05} + a_{1R} * (d_{05} * d_R) + a_{1K} * (d_{05} * d_K) + a_2 * d_T + X'_{02}\Pi + \beta(d_T * d_{05}) + e_{it}$

	sb_1			sup		
	(1)	*(2)*	*(3)*	*(1)*	*(2)*	*(3)*
Income and assets						
Increase in net income	3,870.40***	3,753.00***	3,131.21***	3,097.09***	3,190.48***	2,941.59***
	(510.07)	(504.32)	(617.25)	(377.19)	(374.05)	(591.02)
Own homestead land	0.09**	0.09**	0.08	0.09***	0.09***	0.10**
	(0.04)	(0.04)	(0.06)	(0.02)	(0.02)	(0.05)
Roof made of tin	0.14***	0.13***	0.15***	0.14***	0.15***	0.15***
	(0.04)	(0.04)	(0.05)	(0.02)	(0.02)	(0.04)
Livestock						
Number of cow/bulls	1.68***	1.69***	1.63***	1.74***	1.75***	1.70***
	(0.05)	(0.05)	(0.07)	(0.03)	(0.03)	(0.06)
Number of goat/sheeps	0.46***	0.46***	0.48***	0.46***	0.46***	0.45***
	(0.06)	(0.06)	(0.08)	(0.03)	(0.03)	(0.06)
Number of duck/hens	0.68***	0.65***	0.69***	0.66***	0.70***	0.69***
	(0.20)	(0.20)	(0.27)	(0.13)	(0.13)	(0.23)
Productive assets						
Number of fishing nets	0.00	0.00	-0.03	0.03	0.03*	-0.02
	(0.02)	(0.02)	(0.03)	(0.02)	(0.02)	(0.02)
Number of big trees	0.35**	0.34**	0.28	0.55***	0.55***	0.75***
	(0.15)	(0.15)	(0.18)	(0.18)	(0.18)	(0.21)
Number of rickshaw/vans	0.01	0.01	0.02	0.05***	0.05***	0.02
	(0.02)	(0.02)	(0.03)	(0.01)	(0.01)	(0.02)
Number of bicycles	0.00	0.00	-0.02**	0.01	0.01	-0.01
	(0.01)	(0.01)	(0.01)	0.00	0.00	(0.01)
Household Durable Goods						
Number of chair/tables	0.16***	0.15***	0.18**	0.11***	0.11***	0.17***
	(0.05)	(0.05)	(0.07)	(0.04)	(0.04)	(0.06)
Number of beds	0.16***	0.15***	0.15**	0.17***	0.18***	0.17***
	(0.05)	(0.05)	(0.06)	(0.03)	(0.03)	(0.05)
Number of radio/TVs	0.01**	0.01**	0.01	0.01	0.01	0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Number of quilt/blankets	0.23***	0.22***	0.20***	0.16***	0.17***	0.16***
	(0.02)	(0.02)	(0.03)	(0.01)	(0.01)	(0.03)
Number of tubewells	0.16***	0.16***	0.15***	0.09***	0.09***	0.13***
	(0.03)	(0.03)	(0.03)	(0.01)	(0.01)	(0.03)
Food security						
Food availability	0.24***	0.24***	0.24***	0.32***	0.32***	0.25***
	(0.04)	(0.04)	(0.05)	(0.02)	(0.02)	(0.04)
Meals twice a day	0.37***	0.37***	0.42***	0.36***	0.37***	0.42***
	(0.03)	(0.03)	(0.04)	(0.02)	(0.02)	(0.04)
Grain stocks (kg)	2.15**	2.06**	3.18*	1.28**	1.30***	2.17
	(1.03)	(1.02)	(1.64)	(0.50)	(0.50)	(1.42)
Health outcomes						
Health status	0.06	0.06	0.04	0.03	0.03	0.04
	(0.04)	(0.04)	(0.05)	(0.02)	(0.02)	(0.04)
Health improvement	0.03	0.03	0.05	0.04*	0.04*	0.01
	(0.04)	(0.04)	(0.05)	(0.02)	(0.02)	(0.04)
Women's empowerment						
Number of saris	0.30***	0.29***	0.31***	0.29***	0.29***	0.30***
	(0.05)	(0.05)	(0.06)	(0.03)	(0.03)	(0.05)
Ratio saris/lungis	0.07	0.07	0.10	0.03*	0.03*	0.11*
	(0.06)	(0.06)	(0.08)	(0.02)	(0.02)	(0.07)
Other						
Do you have shoes?	0.10***	0.11***	0.13***	0.15***	0.15***	0.14***
	(0.03)	(0.03)	(0.04)	(0.01)	(0.01)	(0.03)

Robust standard errors in parentheses

$***p < 0.01, **p < 0.05, *p < 0.1$

Note: marginal effects from probit regression for dummy variables, OLS coefficients for Increase in net income (measured in Taka), Number of saris, ratio of saris to lungis, livestock, productive assets and furniture.

Y_{it} is the outcome variable of interest for household i in year t, d_{05} is a dummy that equals 1 for the year 2005, and d_T is a dummy that equals 1 when household i belongs to an appropriately defined treatment group (i.e., SB_1; SUP) and equals zero when a household belongs to the corresponding control group (i.e., SB_0;$NSUP$). d_R and d_K are dummy variables for Rangpur and Kurigram districts. X_{02} is a vector of controls in 2002.

Table 3b: Ratio of treatment effect to the group mean for treatment groups in 2002

	sb_1			*sup*		
	(1)	*(2)*	*(3)*	*(1)*	*(2)*	*(3)*
Income and assets						
Increase in net income	0.66	0.64	0.53	0.38	0.39	0.36
Own homestead land	0.24	0.23	0.21	0.18	0.18	0.22
Roof made of tin	0.46	0.45	0.50	0.47	0.49	0.49
Livestock						
Number of cow/bulls	168.26	168.57	163.29	43.61	43.65	42.59
Number of goat/sheeps	7.67	7.69	8.07	5.11	5.10	4.99
Number of duck/hens	0.95	0.91	0.98	0.79	0.83	0.82
Productive assets						
Number of fishing nets	n/a	n/a	n/a	10.16	11.21	-9.09
Number of big trees	0.91	0.90	0.74	1.10	1.11	1.51
Number of rickshaw/vans	0.94	0.92	1.08	2.68	2.69	1.32
Number of bicycles	-0.91	-0.99	-8.45	2.54	2.64	-5.22
Household Durable Goods						
Number of chair/tables	1.14	1.10	1.29	0.52	0.54	0.81
Number of beds	0.23	0.21	0.22	0.24	0.24	0.23
Number of radio/TVs	2.93	2.82	3.23	0.52	0.53	0.32
Number of quilt/blankets	22.70	22.39	19.89	8.24	8.30	8.24
Number of tubewells	9.07	9.09	8.30	6.14	6.20	8.66
Food security						
Food availability	13.39	13.34	13.44	13.42	13.53	10.69
Meals twice a day	0.76	0.76	0.87	0.72	0.74	0.84
Grain stocks (kg)	n/a	n/a	n/a	n/a	n/a	n/a
Health outcomes						
Health status	0.17	0.16	0.10	0.06	0.07	0.09
Health improvement	0.07	0.07	0.12	0.08	0.08	0.02
Women's empowerment						
Number of saris	0.17	0.17	0.18	0.17	0.17	0.17
Ratio saris/lungis	0.07	0.07	0.09	0.03	0.03	0.10
Other						
Do you have shoes?	0.18	0.18	0.23	0.27	0.27	0.24

Table 4a: Estimated treatment effects from DIDM estimator

	sb_1			*sup*		
	radius caliper	**nearest 2 neighbors**	**kernel**	**radius caliper**	**nearest 2 neighbors**	**kernel**
	(1)	*(2)*	*(3)*	*(1)*	*(2)*	*(3)*
Income and assets						
Increase in net income	3329.33***	3562.72***	3323.82***	3075.45***	3529.33***	3049.56***
	(589.42)	(659.30)	(590.98)	(614.18)	(692.36)	(616.82)
Own homestead land	0.02	0.02	0.03	0.02	-0.02	0.00
	(0.04)	(0.04)	(0.04)	(0.03)	(0.04)	(0.03)
Roof made of tin	0.15***	0.14***	0.14***	0.13***	0.11***	0.12***
	(0.05)	(0.05)	(0.04)	(0.04)	(0.04)	(0.04)
Livestock						
Number of cow/bulls	1.60***	1.62***	1.60***	1.64***	1.64***	1.64***
	(0.05)	(0.14)	(0.14)	(0.05)	(0.05)	(0.07)
Number of goat/sheeps	0.48***	0.46***	0.48***	0.45***	0.44***	0.45***
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)
Number of duck/hens	0.69***	0.66***	0.67***	0.67**	0.71***	0.62***
	(0.26)	(0.30)	(0.26)	(0.23)	(0.27)	(0.23)
Productive assets						
Number of fishing nets	0.00	-0.01	-0.01	-0.01	0.00	0.00
	(0.04)	(0.05)	(0.04)	(0.03)	(0.04)	(0.03)
Number of big trees	0.19	0.10	0.18	0.43*	0.25	0.37
	(0.19)	(0.23)	(0.19)	(0.27)	(0.30)	(0.27)
Number of rickshaw/vans	0.01	0.00	0.01	0.02	0.02	0.02
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Number of bicycles	-0.01	-0.01	0.00	0.00	-0.01	0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Household Durable Goods						
Number of chair/tables	0.18***	0.15**	0.17***	0.16***	0.09	0.15***
	(0.07)	(0.09)	(0.07)	(0.06)	(0.07)	(0.06)
Number of beds	0.16***	0.13**	0.16***	0.15***	0.14***	0.14***
	(0.06)	(0.07)	(0.06)	(0.05)	(0.06)	(0.05)
Number of radio/TVs	0.01**	0.02***	0.01	0.01	0.01	0.01
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Number of quilt/blankets	0.20***	0.20***	0.20***	0.17***	0.16***	0.17***
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)
Number of tubewells	0.17***	0.17***	0.17***	0.16***	0.16***	0.16***
	(0.03)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)
Food security						
Food availability	0.27***	0.27***	0.26***	0.26***	0.25***	0.25***
	(0.02)	(0.03)	(0.02)	(0.02)	(0.03)	(0.03)
Meals twice a day	0.41***	0.41***	0.40***	0.40***	0.38***	0.40***
	(0.05)	(0.05)	(0.05)	(0.04)	(0.05)	(0.04)
Grain stocks (kg)	3.23***	3.28***	3.23***	2.66**	2.71*	2.65**
	(1.09)	(1.10)	(1.09)	(1.38)	(1.63)	(1.39)
Health outcomes						
Health status	0.04	0.04	0.05	0.08	0.04	0.12
	(0.06)	(0.07)	(0.06)	(0.04)	(0.05)	(0.04)
Health improvement	0.06	0.05	0.06	-0.02	0.04	0.03
	(0.05)	(0.06)	(0.05)	(0.05)	(0.05)	(0.04)
Women's empowerment						
Number of saris	O.32***	0.33***	0.32***	0.30***	0.30***	0.29***
	(0.05)	(0.07)	(0.06)	(0.05)	(0.06)	(0.05)
Ratio saris/lungis	0.07	0.14	0.07	0.04	0.04	0.06
	(0.09)	(0.11)	(0.10)	(0.08)	(0.09)	(0.08)
Other						
Do you have shoes?	0.12***	0.12**	0.11***	0.11***	0.09***	0.11***
	(0.03)	(0.05)	(0.04)	(0.03)	(0.04)	(0.03)

Standard errors in parentheses
$***p < 0.01, **p < 0.05, *p < 0.1$

DIDM stands for Difference in Difference estimation combined with matching. Matching on observables is based on the following variables: all inclusion criteria, indicators of physical and human capital (for example, land owned, household size, body mass index, age, and the indicator of women working as day laborers).

Table 4b: Ratio of treatment effect to the group mean (DIDM estimator)

	sb_1			sup		
	radius caliper *(1)*	**nearest 2 neighbors** *(2)*	**kernel** *(3)*	**radius caliper** *(1)*	**nearest 2 neighbors** *(2)*	**kernel** *(3)*
Income and assets						
Increase in net income	0.57	0.61	0.57	0.38	0.43	0.37
Own homestead land	0.06	0.06	0.08	0.05	-0.03	0.00
Roof made of tin	0.51	0.46	0.48	0.42	0.36	0.39
Livestock						
Number of Cow/bull	168.90	170.99	168.91	46.99	46.78	46.96
Number of goat/sheeps	10.48	10.10	10.45	4.84	4.76	4.79
Number of duck/hens	1.46	1.41	1.42	0.79	0.84	0.74
Productive assets						
Number of fishing nets	n/a	n/a	n/a	-2.02	1.83	0.07
Number of big trees	0.45	0.23	0.43	0.86	0.49	0.74
Number of rickshaw/vans	1.22	0.00	1.38	0.95	1.35	0.96
Number of bicycles	-2.68	-4.02	-2.13	-1.91	-3.43	-1.99
Household Durable Goods						
Number of chair/tables	1.10	0.94	1.05	0.77	0.41	0.73
Number of beds	0.23	0.18	0.23	0.20	0.19	0.19
Number of radio/TVs	2.97	3.76	2.82	1.05	0.74	0.87
Number of quilt/blankets	20.83	20.93	21.16	10.60	10.23	10.65
Number of tubewells	9.83	10.09	9.92	10.47	10.73	10.80
Food security						
Food availability	13.89	17.22	15.00	11.31	10.87	10.87
Meals twice a day	0.85	0.85	0.83	0.80	0.76	0.78
Grain stocks (kg)	n/a	n/a	n/a	n/a	n/a	n/a
Health outcomes						
Health status	0.00	0.16	0.11	0.12	0.15	0.10
Health improvement	0.14	0.11	0.13	-0.05	0.08	0.06
Women's empowerment						
Number of saris	0.19	0.20	0.19	0.17	0.17	0.17
Ratio saris/lungis	0.06	0.13	0.06	0.04	0.04	0.05
Other						
Do you have shoes?	0.21	0.21	0.20	0.20	0.17	0.19

DIDM stands for Difference in Difference estimation combined with matching. Matching on observables is based on the following variables: all inclusion criteria, indicators of physical and human capital (for example, land owned, household size, body mass index, age, and the indicator of women working as day laborers).

Table 5: Sensitivity analysis for selected outcomes

		sb_1		sup	
	Gamma	Q_{mh+}	p_{mh+}	Q_{mh+}	p_{mh+}
Increase in net income	1.00	2611.36	0.00	2434.58	0.00
	1.10	2311.56	0.00	2137.19	0.00
	1.30	1806.53	0.00	1629.22	0.00
	1.50	1387.82	0.00	1212.56	0.00
	2.00	572.52	0.02	391.86	0.06
Roof made of tin	1.00	1.23	0.11	3.55	0.00
	1.10	0.90	0.18	2.80	0.00
	1.30	0.33	0.37	1.49	0.07
	1.50	-0.12	0.55	0.37	0.35
	2.00	0.87	0.19	1.75	0.04
Number of cow/bulls	1.00	22.95	0.00	26.77	0.00
	1.10	22.22	0.00	25.96	0.00
	1.30	20.95	0.00	24.56	0.00
	1.50	19.90	0.00	23.40	0.00
	2.00	17.92	0.00	21.17	0.00
Number of goat/sheeps	1.00	7.42	0.00	8.10	0.00
	1.10	6.98	0.00	7.55	0.00
	1.30	6.22	0.00	6.61	0.00
	1.50	5.60	0.00	5.82	0.00
	2.00	4.40	0.00	4.31	0.00
Number of duck/hens	1.00	2.50	0.01	2.73	0.00
	1.10	1.83	0.03	1.93	0.03
	1.30	0.65	0.26	0.54	0.29
	1.50	0.22	0.41	0.53	0.30
	2.00	2.24	0.01	2.93	0.00
Number of fishing nets	1.00	0.59	0.28	0.62	0.27
	1.10	0.91	0.18	1.01	0.16
	1.30	1.47	0.07	1.69	0.05
	1.50	1.96	0.03	2.29	0.01
	2.00	2.97	0.00	3.52	0.00
Number of big trees	1.00	1.16	0.12	0.93	0.18
	1.10	0.72	0.24	0.40	0.34
	1.30	-0.05	0.52	0.34	0.37
	1.50	0.49	0.31	1.12	0.13
	2.00	1.81	0.03	2.73	0.00
Number of rickshaw/vans	1.00	1.79	0.04	2.16	0.02
	1.10	1.57	0.06	1.89	0.03
	1.30	1.20	0.11	1.42	0.08
	1.50	0.89	0.19	1.02	0.15
	2.00	0.27	0.39	0.24	0.40
Number of bicycles	1.00	0.33	0.37	1.13	0.13
	1.10	0.42	0.34	1.28	0.10
	1.30	0.59	0.28	1.54	0.06
	1.50	0.73	0.23	1.77	0.04
	2.00	1.04	0.15	2.26	0.01

For increase in net income, we present Wilcoxon signrank tests that give the upper and lower bounds on significance of the treatment effects for a given level of selection on unobservables (i.e., hidden bias). In each other case, dummy variable that equals one if the change in the period was positive. Q_{mh+} is the Mantel-Haenszel statistic under the assumption that the estimated treatment effect is overestimated (relevant when the expected treatment effect is positive). The corresponding P-values is reported as p_{mh+}.

Table 5 cont.: Sensitivity analysis for selected outcomes

		sb_1		sup	
	Gamma	Q_{mh+}	p_{mh+}	Q_{mh+}	p_{mh+}
Number of chair/tables	1.00	1.72	0.04	1.73	0.04
	1.10	1.19	0.12	1.09	0.14
	1.30	0.27	0.39	-0.02	0.51
	1.50	0.33	0.37	0.82	0.20
	2.00	1.92	0.03	2.75	0.00
Number of beds	1.00	1.63	0.05	2.41	0.01
	1.10	1.00	0.16	1.68	0.05
	1.30	-0.06	0.52	0.40	0.34
	1.50	0.88	0.19	0.56	0.29
	2.00	2.78	0.00	2.76	0.00
Number of radio/TVs	1.00	1.33	0.09	-0.16	0.56
	1.10	1.21	0.11	-0.08	0.53
	1.30	1.00	0.16	0.29	0.39
	1.50	0.82	0.21	0.61	0.27
	2.00	0.48	0.32	1.26	0.10
Number of quilt/blankets	1.00	6.64	0.00	6.81	0.00
	1.10	6.22	0.00	6.28	0.00
	1.30	5.49	0.00	5.37	0.00
	1.50	4.89	0.00	4.60	0.00
	2.00	3.74	0.00	3.12	0.00
Number of tubewells	1.00	3.91	0.00	3.87	0.00
	1.10	3.28	0.00	3.12	0.00
	1.30	2.19	0.01	1.82	0.03
	1.50	1.26	0.10	0.71	0.24
	2.00	0.44	0.33	1.39	0.08
Food availability	1.00	8.15	0.00	7.79	0.00
	1.10	8.66	0.00	8.42	0.00
	1.30	9.56	0.00	9.54	0.00
	1.50	10.36	0.00	10.52	0.00
	2.00	12.05	0.00	12.58	0.00
Meals twice a day	1.00	3.25	0.00	6.54	0.00
	1.10	3.00	0.00	6.00	0.00
	1.30	2.56	0.01	5.08	0.00
	1.50	2.19	0.01	4.31	0.00
	2.00	1.48	0.07	2.80	0.00
Grain stocks (kg)	1.00	2.02	0.02	2.07	0.02
	1.10	1.88	0.03	1.88	0.03
	1.30	1.64	0.05	1.56	0.06
	1.50	1.44	0.08	1.30	0.10
	2.00	1.06	0.15	0.79	0.22
Number of saris	1.00	0.98	0.16	3.95	0.00
	1.10	0.67	0.25	3.25	0.00
	1.30	0.12	0.45	2.01	0.02
	1.50	0.05	0.48	0.96	0.17
	2.00	0.99	0.16	1.01	0.16
Ratio sari/ lungi	1.00	0.15	0.44	1.18	0.12
	1.10	0.10	0.46	1.07	0.14
	1.30	0.02	0.49	0.88	0.19
	1.50	-0.05	0.52	0.71	0.24
	2.00	-0.20	0.58	0.39	0.35
Do you have shoes?	1.00	1.75	0.04	3.78	0.00
	1.10	1.43	0.08	3.03	0.00
	1.30	0.86	0.20	1.71	0.04
	1.50	0.37	0.36	0.59	0.28
	2.00	0.31	0.38	1.54	0.06

In each case, dummy variable that equals one if the change in the period was positive. Q_{mh+} is the Mantel-Haenszel statistic under the assumption that the estimated treatment effect is overestimated (relevant when the expected treatment effect is positive). The corresponding $P-values$ is reported as p_{mh+}.

Table 6 - Quantile DID, increase in net income

(1): $Y_{it} = a_0 + a_1 * d_{05} + a_2 * d_T + \beta(d_T * d_{05}) + e_{it}$

(2): $Y_{it} = a_0 + a_1 * d_{05} + a_{1R} * (d_{05} * d_R) + a_{1K} * (d_{05} * d_K) + a_2 * d_T + \beta(d_T * d_{05}) + e_{it}$

(3): $Y_{it} = a_0 + a_1 * d_{05} + a_{1R} * (d_{05} * d_R) + a_{1K} * (d_{05} * d_K) + a_2 * d_T + X'_{02}\Pi + \beta(d_T * d_{05}) + e_{it}$

	q1	q2	q3	q4	q5	q6	q7	q8	q9
sb_1									
(1)	1,310.00**	1,830.00***	2,120.00***	2,239.00***	2,385.00***	2,300.00***	2,265.00***	2,178.00***	2,460.00***
	(514.98)	(354.38)	(325.83)	(346.32)	(278.64)	(275.61)	(295.76)	(375.26)	(392.54)
(2)	1,510.00***	1,610.00***	1,950.00***	1,879.00***	2,010.00***	1,665.00***	1,790.00***	2,030.00***	2,210.00***
	(567.76)	(418.97)	(405.36)	(416.14)	(402.05)	(434.50)	(423.06)	(435.39)	(434.01)
(3)	836.36	1,530.96***	1,021.99**	1,040.96**	1,378.76***	1,553.24***	1,697.76***	2,134.73***	2,305.76***
	(693.43)	(550.71)	(498.36)	(462.21)	(343.06)	(399.76)	(454.20)	(478.78)	(443.17)
sup									
(1)	1,470.00***	1,890.00***	2,070.00***	2,050.00***	2,310.00***	2,190.00***	2,370.00***	2,560.00***	2,580.00***
	(292.04)	(209.24)	(273.92)	(253.29)	(392.07)	(325.33)	(342.92)	(331.26)	(349.09)
(2)	1,560.00***	1,500.00***	1,680.00***	1,920.00***	2,330.00***	2,220.00***	2,420.00***	2,415.00***	2,430.00***
	(335.55)	(230.03)	(294.87)	(359.59)	(244.88)	(255.53)	(223.52)	(284.64)	(286.74)
(3)	817.35	1,074.65*	854.36*	1,208.39**	1,480.20***	1,671.56***	1,938.12***	2,204.53***	2,219.56***
	(725.64)	(549.86)	(508.96)	(489.31)	(490.32)	(458.71)	(513.87)	(556.27)	(521.38)

Standard errors in parentheses

$***p < 0.01, **p < 0.05, *p < 0.1$

Y_{it} is the outcome variable 'increase in net income for household' i in year t, d_{05} is a dummy that equals 1 for the year 2005, and d_T is a dummy that equals 1 when household i belongs to an appropriately defined treatment group (i.e., SB_1; SUP) and equals zero when a household belongs to the corresponding control group (i.e., SB_0;$NSUP$). d_R and d_K are dummy variables for Rangpur and Kurigram districts. X_{02} is a vector of controls in 2002.

APPENDIX TABLES (NOT FOR PUBLICATION)

Table A.3a: Impact of program on SNB_1 group

(1): $Y_{it} = a_0 + a_1 * d_{05} + a_2 * d_T + \beta(d_T * d_{05}) + e_{it}$

(2): $Y_{it} = a_0 + a_1 * d_{05} + a_{1R} * (d_{05} * d_R) + a_{1K} * (d_{05} * d_K) + a_2 * d_T + \beta(d_T * d_{05}) + e_{it}$

(3): $Y_{it} = a_0 + a_1 * d_{05} + a_{1R} * (d_{05} * d_R) + a_{1K} * (d_{05} * d_K) + a_2 * d_T + X'_{02}\Pi + \beta(d_T * d_{05}) + e_{it}$

	snb_1		
	(1)	*(2)*	*(3)*
Income and asset			
Increase in net income	3,514.86***	3,757.73***	1,626.53
	(484.70)	(480.61)	(1,843.86)
Own homestead land	0.07***	0.07***	-0.01
	(0.02)	(0.02)	(0.10)
Roof made of tin	0.14***	0.16***	0.17*
	(0.02)	(0.02)	(0.10)
Livestock			
Number of Cow/bulls	1.78***	1.78***	1.93***
	(0.04)	(0.04)	(0.14)
Number of goat/sheeps	0.46***	0.46***	0.33**
	(0.04)	(0.04)	(0.14)
Number of duck/hens	0.72***	0.82***	0.23
	(0.17)	(0.17)	(0.53)
Productive assets			
Number of fishing nets	0.08***	0.08***	0.03
	(0.02)	(0.02)	(0.05)
Number of big trees	0.54**	0.55**	1.27
	(0.26)	(0.27)	(0.86)
Number of rickshaw/vans	0.07***	0.07***	0.05
	(0.01)	(0.01)	(0.04)
Number of bicycles	0.01	0.01*	-0.02
	(0.01)	(0.01)	(0.04)
Household Durable Goods			
Number of chair/tables	0.13***	0.14***	0.14
	(0.05)	(0.05)	(0.17)
Number of beds	0.21***	0.22***	0.11
	(0.04)	(0.04)	(0.13)
Number of radio/TVs	0.01	0.01	-0.03
	(0.01)	(0.01)	(0.03)
Number of quilt/blankets	0.12***	0.12***	0.05
	(0.02)	(0.02)	(0.06)
Number of tubewells	0.11***	0.11***	0.07
	(0.02)	(0.02)	(0.07)
Food security			
Food availability	0.34***	0.35***	0.17*
	(0.03)	(0.03)	(0.10)
Meals twice a day	0.37***	0.38***	0.43***
	(0.02)	(0.02)	(0.07)
Grain stocks (kg)	0.93	0.94	-1.77
	(0.59)	(0.59)	(3.54)
Health outcomes			
Health status	0.01	0.01	0.14
	(0.02)	(0.02)	(0.10)
Health improvement	0.03	0.03	-0.09
	(0.02)	(0.02)	(0.10)
Women's empowerment			
Number of saris	0.30***	0.31***	0.26*
	(0.04)	(0.04)	(0.12)
Ratio saris/lungis	0.03	0.03	0.21*
	(0.02)	(0.02)	(0.12)
Other			
Do you have shoes?	0.18***	0.19***	0.12*
	(0.02)	(0.02)	(0.08)

Robust standard errors in parentheses

$***p < 0.01, **p < 0.05, *p < 0.1$

Note: marginal effects from probit regression for dummy variables, OLS coefficients for Increase in net income (measured in Taka), Number of saris, ratio of saris to lungis, livestock, productive assets and furniture. Y_{it} is the outcome variable of interest for household i in year t, d_{05} is a dummy that equals 1 for the year 2005, and d_T is a dummy that equals 1 when household i belongs to SNB_1 and equals zero when a household belongs to the corresponding control group, SNB_0. d_R and d_K are dummy variables for Rangpur and Kurigram districts. X_{02} is a vector of controls in 2002.

Table A.3b: Ratio of treatment effect to the mean for SNB_1 group in 2002

		snb_1	
	(1)	*(2)*	*(3)*
Income and assets			
Increase in net income	0.36	0.38	0.17
Own homestead land	0.13	0.14	-0.02
Roof made of tin	0.44	0.51	0.54
Livestock			
Number of cow/bulls	33.14	33.20	36.03
Number of goat/sheeps	3.96	3.97	2.85
Number of duck/hens	0.77	0.87	0.25
Productive assets			
Number of fishing nets	17.35	19.20	7.23
Number of big trees	0.93	0.95	2.19
Number of rickshaw/vans	3.87	3.94	2.70
Number of bicycles	3.65	3.85	-6.10
Household Durable Goods			
Number of chair/tables	0.50	0.54	0.55
Number of beds	0.27	0.29	0.14
Number of radio/TVs	0.68	0.71	-0.67
Number of quilt/blankets	6.45	6.60	2.53
Number of tubewells	8.98	9.21	5.29
Food security			
Food availability	12.36	12.72	6.18
Meals twice a day	0.71	0.73	0.82
Grain stocks (kg)	n/a	n/a	n/a
Health outcomes			
Health status	0.02	0.02	0.30
Health improvement	0.06	0.06	-0.17
Women's empowerment			
Number of saris	0.17	0.18	0.15
Ratio saris/lungis	0.02	0.03	0.19
Other			
Do you have shoes?	0.33	0.33	0.21

Table A.4a: Estimated treatment effects from DIDM estimator

	snb_1		
	radius caliper	**nearest 2 neighbors**	**kernel**
	(1)	*(2)*	*(3)*
Income and assets			
Increase in net income	1638.47*	593.24	1664.83
	(1638.06)	(1711.19)	(1697.27)
Own homestead land	-0.15***	-0.15**	-0.18***
	(0.07)	(0.08)	(0.07)
Roof made of tin	0.11*	0.11	0.10
	(0.08)	(0.10)	(0.09)
Livestock			
Number of cow/bulls	1.90***	1.96***	1.89***
	(0.15)	(0.15)	(0.14)
Number of goat/sheeps	0.31**	0.35**	0.30**
	(0.17)	(0.18)	(0.18)
Number of duck/hens	0.25	0.45	0.20
	(0.53)	(0.59)	(0.54)
Productive assets			
Number of fishing nets	0.00	-0.01	0.01
	(0.05)	(0.07)	(0.05)
Number of big trees	0.57	0.08	0.58
	(0.73)	(0.42)	(0.77)
Number of rickshaw/vans	0.04	0.04	0.04
	(0.04)	(0.04)	(0.04)
Number of bicycles	-0.01	0.00	-0.01
	(0.04)	(0.03)	(0.04)
Household Durable Goods			
Number of chair/tables	0.12	0.10	0.11
	(0.14)	(0.18)	(0.14)
Number of beds	0.08	0.14	0.08
	(0.11)	(0.12)	(0.11)
Number of radio/TVs	0.00	-0.01	0.00
	(0.03)	(0.03)	(0.03)
Number of quilt/blankets	0.02	0.02	0.01
	(0.07)	(0.08)	(0.07)
Number of tubewells	0.08	0.02	0.09
	(0.07)	(0.08)	(0.07)
Food security			
Food availability	0.13***	0.15***	0.13***
	(0.06)	(0.07)	(0.06)
Meals twice a day	0.39***	0.39***	0.40***
	(0.09)	(0.11)	(0.10)
Grain stocks (kg)	-1.88	-1.90	-1.46
	(2.90)	(5.98)	(3.10)
Health outcomes			
Health status	0.16	0.11	0.13
	(0.11)	(0.11)	(0.10)
Health improvement	-0.09	-0.07	-0.09
	(0.10)	(0.12)	(0.10)
Women's empowerment			
Number of saris	0.23	0.20	0.23
	(0.13)	(0.14)	(0.13)
Ratio saris/lungis	0.29*	0.33	0.35***
	(0.16)	(0.19)	(0.17)
Other			
Do you have shoes?	0.12	0.12	0.12
	(0.07)	(0.09)	(0.08)

Standard errors in parentheses
$***p < 0.01, **p < 0.05, *p < 0.1$

DIDM stands for Difference in Difference estimation combined with matching. Matching on observables is based on the following variables: all inclusion criteria, indicators of physical and human capital (for example, land owned, household size, body mass index, age, and the indicator of women working as day laborers).

Table A.4b: Ratio of treatment effect to the group mean from DIDM estimator

	snb_1		
	radius caliper	**nearest 2 neighbors**	**kernel**
	(1)	*(2)*	*(3)*
Income and assets			
Increase in net income	0.17	0.06	0.17
Own homestead land	-0.29	-0.29	-0.34
Roof made of tin	0.36	0.34	0.32
Livestock			
Number of cow/bulls	17.25	17.84	17.20
Number of goat/sheeps	1.34	1.51	1.31
Number of duck/hens	0.13	0.23	0.10
Productive assets			
Number of fishing nets	0.31	-0.63	0.53
Number of big trees	0.81	0.11	0.83
Number of rickshaw/vans	1.01	0.93	0.98
Number of bicycles	-8.24	0.00	-4.20
Household Durable Goods			
Number of chair/tables	0.34	0.28	0.31
Number of beds	0.08	0.15	0.09
Number of radio/TVs	-0.21	-0.33	-0.21
Number of quilt/blankets	0.52	0.53	0.24
Number of tubewells	9.10	2.23	10.86
Food security			
Food availability	7.22	8.30	7.20
Meals twice a day	0.75	0.74	0.77
Grain stocks (kg)	n/a	n/a	n/a
Health outcomes			
Health status	0.35	0.24	0.28
Health improvement	-0.16	-0.13	-0.17
Women's empowerment			
Number of saris	0.13	0.11	0.13
Ratio saris/lungis	0.27	0.30	0.32
Other			
Do you have shoes?	0.22	0.22	0.22

DIDM stands for Difference in Difference estimation combined with matching. Matching on observables is based on the following variables: all inclusion criteria, indicators of physical and human capital (for example, land owned, household size, body mass index, age, and the indicator of women working as day laborers).

Table A.5:
Sensitivity analysis for selected outcomes, SNB

		snb_1	
	Gamma	Q_{mh+}	p_{mh+}
Increase	1.00	1460.32	0.03
in net	1.10	1187.23	0.07
income	1.30	676.19	0.19
	1.50	245.30	0.37
	2.00	-587.81	0.77
Roof	1.00	3.16	0.00
made of	1.10	2.52	0.01
tin	1.30	1.42	0.08
	1.50	0.48	0.32
	2.00	1.26	0.10
Number of cow/bulls	1.00	12.42	0.00
	1.10	12.06	0.00
	1.30	11.41	0.00
	1.50	10.87	0.00
	2.00	9.86	0.00
Number of goat/sheeps	1.00	2.35	0.01
	1.10	2.09	0.02
	1.30	1.64	0.05
	1.50	1.26	0.10
	2.00	0.50	0.31
Number of duck/hens	1.00	0.69	0.25
	1.10	0.35	0.36
	1.30	-0.02	0.51
	1.50	0.50	0.31
	2.00	1.54	0.06
Number of fishing nets	1.00	0.41	0.34
	1.10	0.22	0.41
	1.30	-0.13	0.55
	1.50	-0.05	0.52
	2.00	0.56	0.29
Number of big trees	1.00	0.36	0.36
	1.10	0.58	0.28
	1.30	0.96	0.17
	1.50	1.30	0.10
	2.00	1.98	0.02
Number of rickshaw/vans	1.00	1.08	0.14
	1.10	0.93	0.18
	1.30	0.68	0.25
	1.50	0.47	0.32
	2.00	0.04	0.48
Number of bicycles	1.00	-0.61	0.73
	1.10	-0.53	0.70
	1.30	-0.38	0.65
	1.50	-0.26	0.60
	2.00	-0.01	0.50

For increase in net income, we present Wilcoxon signrank tests that give the upper and lower bounds on significance of the treatment effects for a given level of selection on unobservables (i.e., hidden bias). For the other variables, Q_{mh+} is the Mantel-Haenszel statistic under the assumption that the estimated treatment effect is overestimated (relevant when the expected treatment effect is positive). The corresponding P-values is reported as p_{mh+}.

Table A.5 cont.:
Sensitivity analysis for selected outcomes, SNB

		snb_1	
	Gamma	Q_{mh+}	p_{mh+}
Number of chair/tables	1.00	0.72	0.24
	1.10	0.43	0.33
	1.30	-0.08	0.53
	1.50	0.20	0.42
	2.00	1.08	0.14
Number of beds	1.00	0.48	0.31
	1.10	0.18	0.43
	1.30	0.02	0.49
	1.50	0.48	0.32
	2.00	1.39	0.08
Number of radio/TVs	1.00	0.36	0.36
	1.10	0.49	0.31
	1.30	0.71	0.24
	1.50	0.91	0.18
	2.00	1.32	0.09
Number of quilt/blankets	1.00	1.29	0.10
	1.10	1.05	0.15
	1.30	0.62	0.27
	1.50	0.25	0.40
	2.00	0.09	0.46
Number of tubewells	1.00	0.44	0.33
	1.10	0.12	0.45
	1.30	0.16	0.44
	1.50	0.64	0.26
	2.00	1.63	0.05
Food availability	1.00	0.88	0.19
	1.10	1.16	0.12
	1.30	1.65	0.05
	1.50	2.09	0.02
	2.00	2.97	0.00
Meals twice a day	1.00	5.07	0.00
	1.10	4.62	0.00
	1.30	3.84	0.00
	1.50	3.19	0.00
	2.00	1.93	0.03
Grain stocks (kg)	1.00	0.18	0.43
	1.10	0.09	0.47
	1.30	-0.07	0.53
	1.50	-0.21	0.58
	2.00	-0.49	0.69
Number of saris	1.00	3.64	0.00
	1.10	3.05	0.00
	1.30	2.01	0.02
	1.50	1.13	0.13
	2.00	0.46	0.32
Ratio sari lungi	1.00	0.45	0.33
	1.10	0.35	0.36
	1.30	0.17	0.43
	1.50	0.02	0.49
	2.00	-0.28	0.61
Do you have shoes?	1.00	2.72	0.00
	1.10	2.08	0.02
	1.30	0.96	0.17
	1.50	0.00	0.50
	2.00	1.78	0.04

In each case, dummy variable that equals one if the change in the period was positive. Q_{mh+} is the Mantel-Haenszel statistic under the assumption that the estimated treatment effect is overestimated (relevant when the expected treatment effect is positive). The corresponding $P-values$ is reported as p_{mh+}.

Table A.6 - Quantile DID, increase in net income for SNB_1

(1): $Y_{it} = a_0 + a_1 * d_{05} + a_2 * d_T + \beta(d_T * d_{05}) + e_{it}$

(2): $Y_{it} = a_0 + a_1 * d_{05} + a_{1R} * (d_{05} * d_R) + a_{1K} * (d_{05} * d_K) + a_2 * d_T + \beta(d_T * d_{05}) + e_{it}$

(3): $Y_{it} = a_0 + a_1 * d_{05} + a_{1R} * (d_{05} * d_R) + a_{1K} * (d_{05} * d_K) + a_2 * d_T + X'_{02}\Pi + \beta(d_T * d_{05}) + e_{it}$

	q1	q2	q3	q4	q5	q6	q7	q8	q9
snb_1									
(1)	2,100.00***	2,430.00***	2,460.00***	2,470.00***	2,870.00***	2,680.00***	2,625.00***	2,550.00***	2,240.00***
	(568.76)	(647.36)	(730.25)	(675.31)	(647.30)	(612.67)	(637.53)	(690.50)	(572.06)
(2)	1,544.00**	2,470.00***	2,320.00***	2,535.00***	2,770.00***	2,968.00***	2,995.00***	2,860.00***	2,680.00***
	(649.57)	(506.31)	(575.99)	(530.92)	(557.23)	(495.84)	(586.89)	(494.02)	(474.40)
(3)	1,353.80**	1,137.28**	1,181.21**	1,250.18	1,167.45	1,326.26	1,513.32	1,162.80	1,597.69
	(631.82)	(561.00)	(501.74)	(759.49)	(927.57)	(1,070.67)	(1,050.53)	(965.71)	(979.76)

Standard errors in parentheses

$***p < 0.01, **p < 0.05, *p < 0.1$

Y_{it} is the outcome variable of interest for household i in year t, d_{05} is a dummy that equals 1 for the year 2005, and d_T is a dummy that equals 1 when household i belongs to SNB_1 and equals zero when a household belongs to the corresponding control group SNB_0. d_R and d_K are dummy variables for Rangpur and Kurigram districts. X_{02} is a vector of controls in 2002.