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Productive Impacts of Cash Transfer and Conditional Cash Transfer Programs in Bangladesh: Propensity Score Matching Analysis[i]

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Abstract

Bangladesh has a comprehensive portfolio of social protection programs, fruits are yet to be reaped more effectively. However, the extent of their productive impacts is not yet analysed in great detail. The objective of this study is to estimate the productive impacts of cash transfer (old age allowance, allowances for the widowed, destitute and deserted women) and conditional cash transfer programs (stipend for primary students, secondary students and a combination of CFW, FFW, VGD, and 100 days employment scheme) in Bangladesh. The study used the HIES 2010 data. The study used PSM method. The outcome variables were i) labor allocation changes, ii) income generating activities, iii) investments in land, tools, animals, family enterprises, durable goods and housing, iv) investments in human capital, and v) coping mechanisms. Results show that different programs are producing different outcomes. So, policy makers should implement a number of interventions simultaneously to serve the needy.

Keywords: Cash transfer, conditional cash transfer, safety net, impact, PSM, Bangladesh

JEL codes: I32, Y90

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1. Introduction

The most crucial challenge threatening Bangladesh is elimination of widespread poverty. Poverty reduction in Bangladesh has been significant but modest since the 1990s. National poverty head count rate declined from 56.6% in 1991-92 to 31.5% in 2010, while extreme poverty rate declined from 41% in 1991-92 to 17.6% in 2010 (6th FYP, 2012). Despite poverty rate declining by 1.7% per annum at national level, 31.5% of households in the country were living in poverty in 2010 (HIES, 2010). Therefore, till now one of the main agenda of the government of Bangladesh is reduction of poverty. Like many other developing countries, social safety net programs (hereafter SNPs) in Bangladesh can play a vital role in reducing poverty. SNPs are non-contributory transfer programs designed and implemented for the poor of the society. During last several decades many countries in the world implemented a variety of programs to serve the vulnerable and underserved people as means of `protection as well as `promotion`. SNPs in Bangladesh are more than a necessary element in fighting poverty as an increasing number of population is being added extreme poverty category. Due to the high incidence of shocks and the large vulnerable population, the Government of Bangladesh has raised safety net expenditures steadily since the mid 1990s, but program benefits are still extremely inadequate.

There are 30 SNPs in the country covered in the HIES 2010. Of thirty, 5 are conditional cash transfer, 10 are unconditional cash transfer, 9 are public works or training based cash or in kind transfer program and remaining 6 are emergency/ seasonal relief programs. From these SNPs this study considers (i) cash transfer programs such as (a) old age allowance, (b) allowances for the widowed, destitute and deserted, and (ii) conditional cash transfer programs such as (a) stipend for primary students, (b) stipend for secondary students, and (c) a combination of cash for work, vulnerable group development, food for work and 100 days employment scheme.

Given the above backdrop, the objective of this study is to estimate the productive impacts of cash transfer and conditional cash transfer programs in Bangladesh. The paper is organised as follows. Following introduction, a brief review of literature is presented in section 2. Section 3 provides the conceptual framework which is followed by data and analytical framework in section 4 and 5. The results and discussions are presented in section 6. Last section concludes and provides policy recommendation.

1.1 Overview of Social Safety Net Programs in Bangladesh

Safety net spending was around 15% of the government expenditure in Bangladesh in 2010 (Barkat *et al.*, 2011). About 24.6% of households received benefit from the SNPs in 2010 (HIES, 2010). These programs directly transfer resources to poor people. The safety net programs can be categorised in accordance with the specific objective that each program is designed to achieve. For example, programs may be designed to develop infrastructure, provide education incentives to the poor student, ease disaster consequences, or provide livelihood support to disadvantaged groups such as the widowed, deserted and destitute, aged and the disabled. Table 1 presents the major social safety net programs in Bangladesh.

Insert Table 1 here

In FY 2012-13, Tk. 891 million, Tk. 331.20 million, Tk.806.84 million, Tk. 1439.04 million, Tk.1200.00 million, Tk. 949.00 million and Tk.565 million were allocated for OAA, AWDD, CFW, VGD, FFW, Stipend for Primary Students and Stipend for Secondary and Higher Secondary/Female Student, respectively.

Launched in 1998, OAA program has expanded considerably, benefitting about 2.5 million older people. The program targets poor elderly individuals who are at least 65 years of age (62 years for female), have an income of less than Tk. 3000/year and have not worked in the formal sector. The beneficiaries get Tk. 300/month from the program. The selection criteria ensures that 50% of the beneficiaries are women.

The VGD program exclusively targets poor women and provides a monthly food ration for 24 months. Although it was introduced as a relief program in the mid-1970s, it has evolved over time to integrate food security with development objectives. The development package includes training on income-generating activities and awareness-raising for social, legal, health, and nutrition issues; and basic literacy and innumeracy.

The 100-days scheme is a positive and people-oriented program aimed at helping the extremely poor and unemployed people. The most important thing is that the people involved in the program will regain self-confidence and the strength to continue to struggle for survival. Each of the beneficiaries gets Tk. 100 a day for work under the scheme. Registered unemployed people have been issued cards after enlisting. If the registered unemployed people cannot be given an

appropriate job within 15 days after issuance of cards, they will get unemployment allowance. In such cases, they get Tk. 40 each daily for first 30 days and Tk. 50 daily for the rest of the period and the program will last up to 100 days.

Stipend for primary students and stipend for secondary and higher secondary /female students are under cash for education program. Cash for education program was named as a food for education until 2002. At that time this program distributed monthly food grain ration to the households below poverty if they sent their children to primary schools. This SSNP terminated in 2002 and has been replaced by the Primary Education Stipend (PES) program. Now the objectives of this PES are to increase enrolment from poor families, reduce dropout, increase rate of completion, control child labor and raise quality of primary education. Government provide Tk. 100 if one student in the household, Tk. 125 if more than one student in the household. However, this payment is made to mothers' bank accounts. The Government of Bangladesh also provide cash assistance to girls in secondary schools through the female secondary school assistance program. The objectives of program are to increase the number of girl students in secondary schools, increase employment and self-employment among women and reduce underage marriage. Government provides monthly stipend ranging from Tk. 150 (class VI), Tk. 180 (class VII), Tk. 210 (class VIII) to Tk. 360 (class IX and X) along with free tuition (Tk. 60 to 120), book allowance (Tk. 250 for class IX and X) and exempted examination fees (Tk. 550 for SSC student) (Selim, 2009). However, the program was redesigned in 2008 and renamed as the secondary education access and quality enhance program, which includes boys from poor families as well as girls.

2. Brief Literature Review

There are different forms of social protection such as formal and informal. Informal social protection includes sharing and insurance mechanisms within and among communities. Formal arrangements can be either public - provided by the government – or private, provided by actors operating on markets. Public measures can be funded domestically or externally, by donors or international agencies. Safety nets usually fall into this category. Private mechanisms are mainly insurance products available on markets, such as health insurance. Developing countries tend to have large informal social protection systems and some formal public safety nets, mostly funded

by donors. Advanced economies tend to have large formal social protection systems, both public and private, and few informal arrangements.

Devereux (2002) argued that social safety nets can be conceptualised as publicly funded transfer programs with 'consumption smoothing', rather than 'mean shifting', objective. The study highlighted distinctions between three determinants of poverty - low labor productivity, vulnerability, and dependency. The study also distinguished two kinds of anti-poverty interventions such as livelihood promotion and livelihood protection. Within this framework, the study found that even tiny income transfers are often invested in income-generating activities, education, or the acquisition of productive assets, suggesting that social safety nets can play a significant role in reducing chronic poverty. Morduch and Sharma (2002) described the ways of building public safety nets to complement and extend informal and private institutions. They stated that most effective policies will combine transfer systems that are sensitive to existing mechanisms with new institutions for providing insurance and credit and for generating savings. However, the study did not evaluate the impact neither at household nor at community level. Sumarto *et al.* (2004) assessed the impact of several Indonesian social safety net programs on household welfare and poverty dynamics utilising a panel data set of over 10000 households. The impact of participation in the social safety net programs on household consumption was found to be generally positive as expected. However, only the subsidised rice program appeared to have significantly reduced the risk of poverty among participating households.

Ninno and Dorosh (2003) assessed the merits of food and cash transfers using the propensity score matching and found that the marginal propensity to consume for wheat is essentially zero for food for work and 0.51 for food for education. The authors also found that total marginal propensity to consume wheat out of small wheat transfer to poor households is approximately 0.25 while MPC for wheat out of cash transfer is zero. Sadoulet *et al.* (2004) explored the role of conditional cash transfer (CCT) programs in serving as a risk management instrument for the poor. They found that the program was able to keep children in school, implying long-term human development from short-term decisions. Due to a number of shocks - such as unemployment or illness of the household head or younger children, droughts, natural disasters in the community and loss of land, harvest, or animals etc., children had to work instead of going to school implying lower school attendance. This had longer term consequences on educational

achievements and human capital development. Children were used as risk coping instruments without CCTs. Iidiosyncratic and covariate shocks pushed parents to take children out of school and to use child labor as risk coping instruments. Progresa transfers and the conditionality on school attendance served to deter using child labor as a risk coping strategy. The *PROGRESA* cash transfers served as safety nets to keep children at school and out of the labor market. So, CCT protected children from these shocks, creating an additional benefit from these programs as effective safety nets with long term benefits of human capital development.

Gilligan and Hoddinott (2008), assessed the impact of Ethiopia's Productive Safety Net Program (PSNP), the largest social protection program in Sub-Saharan Africa outside of South Africa. The program has little impact on participants on average, due in part to transfer levels that fell far below program targets. Beneficiary households that received at least half of the intended transfers experienced a significant improvement in food security. Households with access to both the PSNP and packages of agricultural support were more likely to be food secured, to borrow for productive purposes, use improved agricultural technologies, and operate their own nonfarm business activities. However, estimates show that beneficiaries did not experience faster asset growth as a result of the programs. On the contrary, Hoddinott (2008) found that safety net interventions contributed to agricultural and economic growth through their impact on asset creation, asset protection, resource allocation, and redistribution. Poorly designed or implemented social protection programs or those with only token funding, are unlikely to meet the intrinsic or instrumental objectives of the social safety net transfers. Well designed and implemented social safety nets interventions can complement pro-poor agricultural investments and thus contribute to longer-term poverty reduction in addition to their short term direct impacts.

Barrientos and Wheeler (2009) examined local economy effects of social transfers, by focusing on food consumption and asset holdings of non-eligible households in rural Mexico following the introduction of *PROGRESA* in 1997. They found that non-eligible households in treatment areas showed significantly higher levels of food consumption and asset holdings following the introduction of *PROGRESA*, compared to non-eligible households in control areas. Transfers in poor rural areas in Mexico enable agents to interact more strategically such that non-beneficiaries, as well as beneficiaries, reap consumption and production advantages. Svarch

(2009) explored the potential influence of access to a CCT program on credit market outcomes. Using fixed effects and instrumental variables methods and household panel data from participants in the *PROGRESA*/Oportunidades CCT in Mexico and non-participant control households the author argued that participation in the program increased the likelihood of participation in credit markets. The increased participation in credit markets is a potential contribution of the CCT to the breadth of outreach of finance in Mexico. Obtained results reflected the behavior of urban households, as there were no credit market data for the rural households and because of the conflicting effects, they cannot be generalized.

Using household panel data from a randomised community-based intervention carried out in both coffee - and non-coffee-growing areas, Maluccio (2005) examined the role of a conditional cash transfer program, the *Red de Proteccion Social* (RPS), during this downturn. Beneficiaries who participated in the coffee industry as laborers before the program were more likely to have exited the coffee industry, whereas those who participated as producers were less likely to have exited. Their findings are consistent with the existence of credit constraints inhibiting such transitions in the absence of the program. Garcia and Hill (2010) estimated impact of conditional cash transfers (*Familias en Accion*) on children's school achievement in Colombia. The program has a positive effect on school achievement for children aged seven to 12 living in rural areas. The study found a negative effect on the school achievement of adolescents, particularly those living in rural areas. Fiszbein (2011) described various experiences with conditional cash transfers, to distil lessons about their effectiveness as crisis-response programs for households with children, to identify design features that can facilitate their ability to respond to transient poverty shocks, and to assess how they can complement other safety-net programs. They argued that investments in cash-transfer systems can pay off, and countries can make productive investments now in systems that will leave them better prepared for the next crisis.

Matin and Hulme (2003) mentioned that program such as income generating VGD, which has goals of livelihood protection and promotion should be a major focus for anti-poverty strategies because this program had widened the outreach of its poverty reduction activities. Their detailed local-level fieldwork revealed, however, that program practice differed markedly from program plans. This is found to have important implications for both future program design and the understanding of 'who` does not benefit from such innovative programs. They conclude that

while such programs, mixing livelihood protection and promotion, should be a major focus for anti-poverty strategies there will remain a role for more traditional social welfare schemes.

Ahmed *et al.* (2007) examined relative efficacy of food and cash transfers in improving food security and livelihoods of the ultra-poor in Bangladesh with a focus on four interventions, including (i) IGVGD and (ii) Food Security VGD (FSVGD) (iii) Food for Asset-creation (FFA) component of the Integrated Food Security (IFS) program, and (iv) Rural Maintenance Program (RMP). Most participants express a preference for the transfer type provided by the program they are participating -72% of IGVGD participants preferred only food; 57% of RMP participants preferred only cash; and 75% of FFA and 48% of FSVGD participants preferred a combination of food and cash. No major contravention of program rules in the beneficiary selection process across the programs. Literacy training does not seem to be effective. Participation in IGVGD, FSVGD, FFA, and RMP raises household per capita food consumption by 45, 66, 23, and 35 kilocalories (kcal), respectively per person per day per Tk. transferred. Participation by an adult female does not lead to increased caloric intakes by preschool-age children in any of the four programs.

Ahmed and Del Ninno (2000) assessed the efficiency of two large targeted food programs (the VGD and the RD programs) to investigate the income and the consumption of grain of the intended beneficiaries and found that the programs are not efficient in delivering food transfers, since the difference between the amount of resources allocated and the amount of resources actually received, referred here as leakage, is positive and sizable. Begum and Wesumperuma (2012) reviewed Bangladesh's Old Age Allowance program and found that the program bears immense value to the country's poor older people by assisting them in meeting their basic needs, enhancing their status at home, and improving their psychosocial well-being, through providing a reliable source of income. It also has some spill over effects to other household members as well as macro impacts. The program does not cover all poor older people. Nor has it been effective in reaching the target population.

3. Conceptual Framework

The concept of social safety net programs leading to productive impacts is built around the hypothesis that the provision of regular and predictable cash/kind transfers to vulnerable

households has the potential to generate productive outcomes at the household level by investment in productive activities, asset accumulation, and change in labor allocation.

Safety net transfers often represent a significant share of household income, and can be expected to help vulnerable households overcome the bottlenecks that block their access to credit or cash and significant changes in household behavior. The study aims to find out how SSN transfers might impact on productive outcome of beneficiary vulnerable households. In Figure 1, we provide some likely pathways linking the social safety nets and productive outcomes. One can see how these pathways can be used as a guiding framework for the empirical parts of this study, especially the productive outcomes of selected SNPs. Possibly SNPs can affect productive outcomes via the following channels (some of them overlap):

- Human capital formation: By facilitating the accumulation and improvement of human capital (training and educational attainment) may enhance productivity and increases employability in the long term.
- Income generation: By weakening credit, savings and/or liquidity constraints, SNPs can facilitate changes in income generating activities. This may include changes in labor allocation (to and/or from labor off farm and on farm); investment in productive activities (use of inputs); and accumulation of productive assets (such as farm tools, land or livestock, durable goods, housing improvement).
- Risk management: Regular and predictable provision of SNPs (cash or kind) may improve the ability to manage risk and shocks. This includes the avoidance of detrimental risk coping strategies (distress sales of productive assets, children school drop-out); the avoidance of risk averse production strategies (safety or eat first); increased risk taking into more profitable crops and/or activities.
- Local economy: The injection of a significant amount of cash into the local economy can stimulate local product and labor markets and create multiplier effects.
- Gender inequalities: The injection of SSN support can lead to enhance productive activities of women because support reduces a source of inefficiency in the household's resource allocation and decision-making and thereby can reduce gender inequalities and can empower women.

From the above discussions, a number of potential outcome variables emerge. We are interested in measuring productive outcome such as labor allocation (farm vs off farm), asset accumulation/protection from distress sale, change in use of inputs & techniques in crop production, human capital accumulation, investments & risk coping strategies at household level.

SNPs help smoothing consumption and enable vulnerable people to bear greater risk. So risk management is supposed to be better through SNPs. Through increased income, savings, and provision of insurance via regular and predictable transfers, SNP beneficiaries can (i) avoid detrimental risk coping strategies, (ii) avoid risk averse production strategies, and (iii) increase risk taking into more profitable crops and/or activities.

Cash transfer for education program for school going children builds lifetime human capital. Students from poor families might be attracted by this program which reduces drop out of school going. Moreover, cognitive development through educational attainment provides skill of the growing children of the poor households. Reduction in drop out of school going pushes the demand up for construction of additional school buildings. Therefore, cash for education program improves human capital, including better nutritional and sound health. The resulting educational attainment enhances the productivity and improves the employability as well.

Insert Figure 1 here

4. Data Source

The study uses the HIES 2010 survey. This household survey was carried out by the Bangladesh Bureau of Statistics from February 2010 to January 2011. Total sample size of the survey was 12,240, where 7,840 households were taken from rural areas and 4,400 from urban areas. HIES 2010 includes data on age, sex, marital status, religion/ethnicity, education, housing, income and expenditure, consumption, employment, health, basic service (water, sanitation and electricity etc.), assets description and social safety nets. The SNP module was first introduced in HIES 2005 in which 11 programs were included but its scope has widened to include 30 SSN programs in HIES 2010.

In total 2989 households out of 12240 were the beneficiaries of different SNPs in HIES 2010. This means that about 25% households received SSN benefits. More than 85% of the beneficiary

households were supported from only one SNP. The remaining beneficiary households got benefit from two or more SNPs. We identified the households having benefits from a single program because our interest is to measure the program wise impacts, so no overlapping is considered.

Only 6.3% of population who were included in SSN programs were considered as participants and rest 93.7% were considered as non-participants. From the non-participants we identified population eligible for SSN benefits by analysing a related question included in the survey instrument of the HIES 2010. Respondents (non-participants of SNP) of HIES 2010 were asked to mention the reasons for not being included in SSN programs. The study considered eligible non-participants (control) as follows. The respondents who stated that they didn't know about the program or they were fit for the program but did not apply or they excluded due to shortness of budget or they stated selection procedure was not proper or if stated no SNP in the area were included in the control group.

We further disaggregate the beneficiaries. After preliminary assessment of HIES 2010 data, 1,879 participants were found to be benefited from the selected 6 SNPs, where 1,349 participants were benefited from single selected SNP and 530 were benefited from multiple SNPs (Table 2). Finally for PSM of selected SNP we used 1,349 participants as treatment group.

Insert Table 2 here

This points to a need to specify program impact and target beneficiaries more clearly, to avoid overlaps in treatment groups, and to minimize the number of households capturing benefits from multiple programs, so, single program beneficiary are selected as sample. For example, in the case of old age allowance, 568 participants have benefited from this program. Out of 568 participants, 118 participants benefited from old age allowance along with at least one of other 29 SNPs, so we deduct this 118 from 568 participants and found 450 single beneficiaries for the sample of this program (Table 3). We follow the same procedure for all SNPs.

5. Analytical Framework

The objective of an impact assessment is to attribute an observed impact to the social safety net program. The identification of the counterfactual is the organising principle of an impact assessment. However, methodological care is necessary because ‘what would have happened

without the selected SNP intervention' is unknown (this is known as counterfactual). We must compare the observed outcome due to the selected SNPs with the outcome that would have resulted had the households not received SSN benefits. In reality we observe only one outcome, which is known as factual outcome. The counterfactual outcome, which we do not observe is the one which would have resulted had the benefit receiving households, not received it. The challenge is to estimate the counterfactual in a reliable way. In this study to assess the impact of social safety net intervention on productive outcome we used propensity score matching (PSM) method. The advantage of PSM method is that this approach do not necessarily require a baseline or panel survey.

Impact is the difference between actual outcome and the outcome would have happened without intervention. In the HIES data we observe what has happened with SNP intervention, but we need to estimate what outcome would have happened without intervention. To take care of this counterfactual problem we require an appropriate analytical technique.

We have chosen matching approach as HIES data are not experimental but sufficiently large and rich. Formally, average impact of program intervention could be expressed as follows (Rubin 1974, Ravallion 2008):

$$\bar{I} = \frac{1}{n}\sum_{i=1}^{n}(Y_i^T - Y_i^C) \qquad (1)$$

where I is `impact`, Y is the value of the interpretable impact indicator, T and C represent treatment group and control group respectively, i represents the sample units and n is the sample size. In randomised control trials or experimental data, the mean I is an unbiased estimator of the true impact. The true impact is unknown, because one of Y^T and Y^C remains unknown at the time of evaluation being done (Dehjia and Wahba, 2002). In RCTs, randomisation ensures that, on average, treated subjects will not differ systematically from untreated subjects in both measured and unmeasured baseline characteristics (Austin, 2009). Non-randomised or non-experimental studies of the effect of treatment on outcomes can be subject to treatment-selection bias in which treated subjects differ systematically from untreated subjects. To elaborate the phenomenon, we may use the following equation:

$$E(I|X) = E(Y_i^T - Y_i^C|X) = E(Y_i^T|X, T) - E(Y_i^C|X, C) \qquad (2)$$

Where X is a vector of the covariates, E refers to expected values. This program impact is generally referred to as the `average impact of the treatment on the treated` (ATT).

Without matching groups (treated and control) there are two sources of bias in ATT (difference between the true average impact and estimated average impact) in non-experimental data (Heckman *et al.*, 1998). First, bias is due to the difference in the supports of X covariates in the treated and control groups and the bias due to the difference between the two groups in the distribution of *X* over its common support. Matching methods are able to reduce the bias reasonably by avoiding potential misspecification when estimating counterfactual. Rosenbaum and Rubin (1983) proposed PSM as a method to reduce the bias in the estimation of intervention impact. The approach identifies a matching untreated control group for the intervention group using estimated propensity scores (PS).

PSM is preferable because it is a non-parametric approach in which the functional relationship between the dependent and independent variables does not need to be specified. PSM on observables also ensures that treated and untreated households are comparable on observable variables. Rubin (2001) argues that an advantage to the use of PSM is that it allows observational studies to be designed similar to randomised experiments.

Different matching algorithms are available to match household with the estimated PS. We have employed Nearest Neighbor Matching (NNM), the most straightforward method of matching, to form pairs of treated and untreated households. However, we carry out sensitivity analysis using few other algorithms such as Caliper Matching, Radius Matching and Kernel Matching. The NNM selects households in the control group as matching partners for beneficiaries, on the basis of the closest propensity scores (Abadie and Imbens 2006; Gilligan *et al.*, 2009).

6. Results and Discussions

6. 1 Productive Outcome Indicators

A list of measurable outcome indicators which are derived from HIES 2010 is presented in Table 3. We considered a broad set of outcomes. Thematically, these are divided into four categories:

Labor allocation: There is a debate surrounding safety net as to whether SNP intervention reduce work effort. In this connection we focus on selecting specific indicators to assess labor allocation. One of the evaluation question in this respect is whether SNP intervention increases

labor participation in both farm and non-farm sectors. We have used average working hours per day per worker in farm and non-farm activities as outcome indicators to measure the impact.

Income generating activities: A persistent concern in policy debates adjacent safety nets is whether their provision reduces work effort in other income-generating activities (IGAs). Therefore, IGAs are assessed by number of total activities per household per active member, total farm income (crop, vegetables, livestock and fishery), total non-farm income (small business, cottage) etc.

Investment: Household investment indicators assess whether the SNP intervention increase or changes in the value of farm assets, new land purchased, agricultural Expenditure increased and increased in durable goods and housing improvement. The study used household expenditure on tools, animals, family enterprises, expenditure on tools, animals, family enterprises, durable goods & housing improvements per person, convert into real terms.

Shock and coping indicators: Shock and coping indicators includes per capita consumption, distressed sale, migration, school dropout etc. Per capita consumption or per capita income is a useful summary measure of household welfare but income shocks cause consumption to reduce in absence of immediate shock coping ability. Variation in consumption is easier to measure than income and consumption smoothing could be indicative shock coping. As such, it provides a better reflection of differences in permanent income. Not only is household consumption expenditure a useful indicator in its own right, improvements in this outcome may contribute to the objective of promoting market development by increasing household purchasing power. Insurance, migration and school dropout are related to shocks and coping mechanism.

Insert Table 3 here

6.2. Variables in PS Estimation

The variables to be included in PS estimation are depicted in Table 4. The dichotomous dependent variable is the dummy variable representing program participation (treated=1). Some of the exogenous X covariates for probit models correspond to targeting criteria of the SNPs. So we have chosen the variables age, gender, education of household head, characteristics of the house (number of people per rooms), own land etc., which are taken into account whilst participants are chosen in the SNPs.

Insert Table 4 here

6.3 Results and Discussions of Estimated PSMs

6.3.1 Old Age Allowance (OAA) Program

All indicators produced insignificant average treatment effect on the treated (ATT) (Table 5). ATT was not significant for any of the indicators. From the Table we can infer that OAA is making positive contribution to labor allocation to non-farm activities and helping to investment more in agricultural assets. Access to credit may also be rising due to OAA. As these results are not statistically significant, it is not possible to make firm conclusions. In Bangladesh OAA receivers are one of the most income vulnerable groups and the amount received is extremely inadequate. This may reflect in the results. Ninety eight percent of OAA beneficiaries reported that the support was inadequate (BRAC, 1998, cited in Barkat, 2013).

Insert Table 5 here

6.3.2 Allowance for the Widowed, Deserted and Destitute (AWDD) Program

Impact of AWDD on the outcome variables are shown in Table 6. Under the social circumstance, women's suffering is acute when they become widowed, divorced and abandoned. ATT was not significant for any of the indicators at the 5% level except value for agricultural assets and livestock income in the last 12 months. From the Table we can infer that AWDD is making positive contribution to labor allocation in non-farm activities and self employment in non-farm sectors. AWDD is helping to spend more in food and health. Access to credit may also be rising due to AWDD. As these results are not statistically significant, it is not possible to make firm conclusions. In Bangladesh AWDD receivers are one of the most income vulnerable groups, in fact they are the most vulnerable group (Barkat *et al.*, 2011). The authors noted that old widows suffer not only from economic poverty but also from physical and psychological isolation, insecurity, incapability, deprivation of resources, low self-esteem, and negligence. The amount distributed under AWDD is extremely inadequate. This may reflect in the results.

Insert Table 6 here

6.3.3 Impact of Stipend for Primary Education (SPE)

Impact of SPE on the outcome variables are shown in Table 7. The ATT was significant for only three indicators. These are non-farm income generating activities, labor allocation in non-farm wage labor, and annual non-food expenses. Thus safety net in primary education program is playing very little role on short term impact on productive outcome. We have not examined here the impact on enrollment, dropout, attendance etc. because they are well documented in the literature confirming positive roles. So there is no doubt that the program has been playing useful role in human capital development and that may be the reason for significant impact on non-farm activities.

Insert Table 7 here

6.3.4 Impact of Stipend for Secondary and Higher Education (SSHE)

ATT was significant for only two indicators (Table 8). These are non-farm self-employment and investment in agricultural asset. Non-farm self-employment increased and at the same time value of agricultural assets decreased. Health expenditure is significant at 10% level and is rising due to program.

Insert Table 8 here

6.3.5 Impact of Combined Program[1]

An attempt is made to find out the impact of combined SNPs (FFW, CFW, 100 days employment scheme and VGD). All indicators produced insignificant impact as measured by ATT. These are all explicitly work related programs and so we would expect them to generate significant productive outcomes. As for example, among the combined programs the employment generation program for hard core poor (EGP) is the largest government safety net program that focused on employment generation. EGP it distinguishes itself from other safety net programs not only by its scale, but also by its intended focus on the hard core unemployed poor. The EGP represents a major breakthrough towards expanding coverage of employment generation-focused safety nets. As among our selected programs, one of the most potential programs that could create productive outcome is the employment generation program for the ultra poor. Unfortunately, impact of the program could not be analysed separately due to

[1] FFW, CFW, VGD, 100 days-employment

inadequate sample size in the HIES 2010. The combined program has only 41 beneficiary households in the sample and so one must consider the result with caution.

6.4 Summary Results of the Impacts from Selected Programs

We have found that OAA had the positive but insignificant impact on 5 productive outcomes like number non-farm activities, self employed in non-farm activities, value of agricultural assets, total credit and expenditure on durable goods. AWDD had the positive but insignificant impact on number of non-farm activities, self employed in non-farm activities, salary of non-farm activity, income from crop production, spending on fertilizer use, total credit and asset sold (7 out of 17 outcome indicators). Therefore, OAA and AWDD are making positive contribution to labor allocation to non-farm activities and helping to investment more in agricultural assets. Access to credit may also be rising due to OAA and AWDD, but as these results are not found statistically significant in our study, therefore it is not possible to make firm conclusions that OAA and AWDD have significant impact on productive outcome. SPE had positive and significant impact on self employed in non-farm activities indicating that the beneficiary household used the stipend in small trading. Income from crop production, income from livestock production, spending on fertilizer use, total credit and education expenditure were positively and significantly influenced by SSHE indicating that the beneficiary households used the stipend in crops and livestock production. Therefore, SPE the ATT was found significant for non-farm income generating activities, labor allocation in non-farm wage labor, and annual non-food expenses. In the case of SSHE, ATT also found significant on non-farm self-employment and investment in agricultural asset. In all the selected SNPs, number of non-farm activities and salary of non-farm activity were positively and significantly influenced by SNPs. This indicates that the beneficiary households engaged more in non-farm activities.

Insert Table 9 here

7. Conclusions

We found OAA and AWDD are making positive contribution to some productive outcomes but as these results are not found statistically significant, therefore it is not possible to make firm conclusions. Safety net in primary and secondary education program are also playing very little role on short term impact on productive outcome. However, based on the overall assessment of

SNPs the study found that ATT was significant for income generating activities (farm), labor allocation (farm self-employment), and investment (agricultural inputs). Credit demand is found to be reduced for the safety net beneficiaries than non-beneficiaries. Based on the results, we can conclude by saying that the safety net programs are promising means for the vulnerable groups. So, for producing productive outcomes from the safety net programs in Bangladesh, the study put forwards the following recommendations. These are (i) social safety net and their scope should be defined clearly and (ii) effectiveness of safety net programs should be monitored through strong MIS mechanism.

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Table 1: Major social safety net programs in Bangladesh

Types	Name of the SNPs
Cash Transfer	▪ Old age allowances (OAA) ▪ Allowances for the widowed, deserted and destitute (AWDD) ▪ Allowance for the financially insolvent disabled ▪ Maternity allowances program for the poor lactating ▪ Honorarium for insolvent freedom fighters ▪ Honorarium for injured freedom fighters ▪ Allowances for distressed cultural personalities/activities ▪ Allowances for beneficiaries in Ctg. hill tract area ▪ Housing support ▪ Maternal health voucher allowance
Conditional Cash Transfer	▪ Stipend for primary students ▪ Stipend for drop out students ▪ Stipend for secondary and higher secondary /female students ▪ Stipend for disabled student ▪ Grants for the schools of disabled
Public works or training based cash or in kind transfer	▪ Food for works (FFW) ▪ Cash for work (CFW) ▪ Agriculture rehabilitation program (ARP) ▪ Vulnerable group development (VGD) ▪ Employment generation program (EGP) for hard-core poor or 100 days ▪ Rural employment, social forestation and rural maintenance program ▪ School feeding program ▪ Rural employment opportunity for protection of public ▪ Char livelihood
Emergency or seasonal relief	▪ Gratuitous relief (cash) (GR) ▪ General relief activities ▪ Food assistance in CTG-Hill tracts area ▪ Subsidy for open market sales (OMS) ▪ Vulnerable group feeding (VGF ▪ Test relief (TR)

Source: HIES, 2010

Figure 1: Conceptual framework (Source: Partially adapted from Ben Davis, 2012)

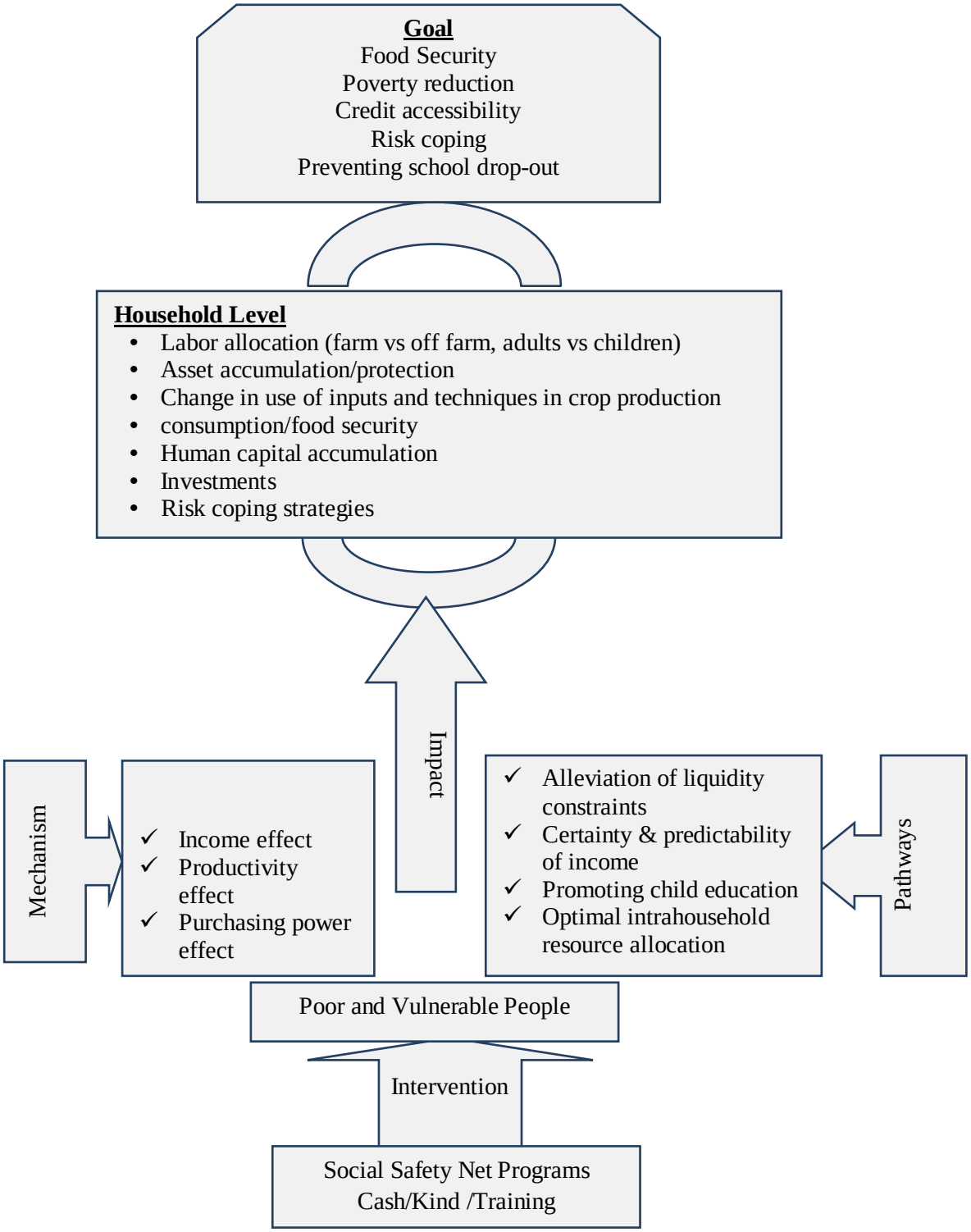

Table 2: Number of beneficiary household of the selected SNPs in HIES 2010

Programs	Selected SNPs	Programs beneficiary households	Included number of HHs benefited by multiple SNPs	Beneficiary of single SNP
1	Old age Allowance	568	83	485
2	Allowance for the Widowed, Deserted and Destitute	238	35	203
3	Combined programs	51	10	41
4	Stipend for Primary Students	630	186	444
5	Stipend for Secondary and Higher Secondary/Female Student	278	102	176
	Total	2325	530	1349

Source: Authors` calculation based on HIES, 2010

Table 3: Measurable productive outcome indicators at household level

Outcomes	**Indicator**	**Measurable indicator**	**Imputed from 2010 HIES**
Labor allocation	Relative farm employment	Average working hours per day per worker in farm activities	Calculating daily male and female hours in farm activities
	Relative non-farm employment	Average working hours per day per worker in non-farm activities	Calculating daily male and female hours in non-farm activities
	Relative male employment	Average working hours per day per male worker	Calculating daily male hours
	Relative female employment	Average working hours per day per female worker	Calculating daily female hours
Income generating activities	Total no. of activities involved	Number of total activities per household per active member	Calculate total number of activities for each active members of the household add them to obtain the total for each household
	Total farm income	Per household	Calculating total farm income (crop, vegetables, livestock and fishery)
	Total non-farm income	Per household	Calculating total non-farm income (small business, cottage)
Investments	Own land per person	Own land per person	Own land per person at household level
	Agricultural Expenditure per household	Real expenditure on tools, animals, family enterprises per household	Calculate household expenditure on tools, animals, family enterprises, and convert into real terms
	Real expenditure on durable goods	Real expenditure on durable goods & housing improvements per person	Calculate household expenditure on tools, animals, family enterprises, durable goods &

	& housing improvement	(may be separate variable for the highlighted things)	housing improvements per person, convert into real terms
Shock and coping mechanism	Asset sold	Dummy variable: if assets sold due to shock =1	
	Per capita consumption	Sum of per capita value of food and non-food expenditures. As it is expected households cope better in shock due to SSN so the variability in per capita food consumption would be lower for beneficiary group. Thus per capita food consumption expenditure due to shock considered as indicator variables.	Food expenditures are based on reports of the consumption of 33 different foods in the 14 days prior to the interview from purchases, stocks and amounts received as gifts, barter or in-kind payments. Non-food expenditures include purchases of fuel and lighting, cosmetics and other expenses, washing and cleaning expenses, transport/ travel and other misc. charges, ready-made garments, clothing material and tailoring, footwear, medical treatment expenses, housing expenses etc.
	Insurance	Dummy variable: if income received from insurance (life, health or general =1	
	Migration	Dummy variable: if any family member migrate to other place =1	
	School drop out	Dummy variable: if any family member (child) drop out from school =1	

Table 4: Observable characteristics included as dependent & independent variables in the PSM

Variables	Description	Mean	Standard Deviation
Dependent variable			
Dummy	Dummy variables (Treated=1)	0.32	0.47
Independent variables			
AgeH	Age of household head (years)	46.14	14.26
EduH	Education of household head (years of schooling	2.78	3.96
EduHD	Household head is illiterate=1	0.62	0.49
Land	Owned land (decimal)	35.87	92.66
LandO	Operated land (decimal) (land+lease in – lease out)	54.45	107.11
FishD	Dummy variable (Income from fish=1)	0.15	0.36
FamS	Total household size	4.48	1.83
Chl514	No of Children 5-14 years	1.12	1.08
Male65	No of Male 65+ year old	0.12	0.33
Female62	No of Female 62+ year	0.15	0.36
FemaleP	Female % in household	52.03	19.28
Disable	Member disable=1	0.12	0.33
Deprat	Dependency ratio	82.68	70.26
DayL	At least a member work as day labor=1	0.03	0.18
mstatF	Women currently unmarried, separated, divorced etc. =1	0.21	0.40
Elect	Electricity connection=1	0.24	0.43
Room	Room per person in household	0.48	0.50
Landless	Dummy variable (landless=1)	0.66	0.47
Homeless	Dummy variable (homeless=1)	0.10	0.30
R1	Regional dummy (Rural=1)	0.69	0.46
R2	Regional dummy (Urban municipality=1)	0.22	0.42
R4	Regional dummy (Urban SMA=1)	0.08	0.27

Table 5: Impact of Old Age Allowance on productive outcomes in Bangladesh

Outcome indicators	**Treatment**	**Control**	**ATT**	**t value**
Number of farm activities	0.45	0.50	-0.06	-1.02
Working hour per day	11.00	11.09	-0.09	-0.13
Number of non-farm activities	1.54	1.48	0.05	0.37
Self employed in farm activities	0.42	0.51	-0.08	-1.28
Self employed in non-farm activities	0.34	0.31	0.04	0.65
Salary of non-farm activity (Tk.)	12585.39	17908.75	-5323.35	-1.10
Income from crop production (Tk.)	12286.59	15686.82	-3400.22	-0.86
Income livestock production (Tk.)	2708.96	5067.86	-2358.90	-1.35
Value of agricultural assets (Tk.)	5315.67	2120.45	3195.22	0.82
Spending on fertilizer use (Tk.)	569.36	757.14	-187.78	-1.33
Total credit (Tk.)	5787.84	5506.19	281.65	0.12
Asset sold	0.02	0.03	-0.01	-0.82
Land purchased	0.01	0.01	0.00	-0.46
Non-food expenditure (Tk.)	39998.82	40082.01	-83.19	-0.01
Expenditure on durable goods (Tk.)	6076.52	3023.38	3053.14	1.32
Food expenditure (Tk.)	364806.02	387960.09	-23154.07	-1.09
Education expenditure (Tk.)	560.12	561.82	-1.70	-0.01

Table 6: Impact of AWDD on productive outcomes in Bangladesh

Outcome indicators	Treatment	Control	ATT	t value
Number of farm activities	0.50	0.54	-0.04	-0.51
Working hour per day	10.53	10.68	-0.16	-0.19
Number of non-farm activities	1.46	1.26	0.20	1.14
Self employed in farm activities	0.41	0.42	-0.01	-0.11
Self employed in non-farm activities	0.29	0.25	0.04	0.53
Salary of non-farm activity (Tk.)	9384.93	9153.65	231.28	0.09
Income from crop production (Tk.)	11097.64	8263.23	2834.41	1.05
Income from livestock production (Tk.)	2208.19	2315.33	-107.14	-0.17
Value of agricultural assets (Tk.)	705.02	1514.48	-809.46	-1.49
Spending on fertilizer use (Tk.)	773.06	486.21	286.85	1.44
Total credit (Tk.)	4936.21	3443.35	1492.86	1.29
Asset sold	0.04	0.01	0.02	1.43
Land purchased	0.00	0.01	-0.01	-1.00
Non-food expenditure (Tk.)	33468.16	35172.31	-1704.14	-0.78
Expenditure on durable goods (Tk.)	2416.01	3147.36	-731.35	-0.95
Food expenditure (Tk.)	346637.13	364316.01	-17678.88	-0.77
Annual education expenditure (Tk.)	493.91	535.86	-41.95	-0.33

Table 7: Impact of primary school stipend on productive outcomes in Bangladesh

Outcome indicators	**Treatment**	**Control**	**ATT**	**t value**
Number of farm activities	0.60	0.64	-0.04	-0.70
Working hour per day	12.91	13.01	-0.09	-0.17
Number of non-farm activities	1.74	1.54	0.20	1.59
Self employed in farm activities	0.61	0.60	0.01	0.13
Self employed in non-farm activities	0.55	0.38	0.17	2.69
Salary of non-farm activity (Tk.)	11100.54	10031.07	1069.47	0.43
Income from crop production (Tk.)	19708.43	21818.98	-2110.55	-0.39
Income livestock production (Tk.)	5459.95	4554.44	905.51	0.38
Value of agricultural assets (Tk.)	6053.90	7621.83	-1567.93	-0.46
Spending on fertilizer use (Tk.)	962.22	1433.78	-471.56	-0.79
Total credit (Tk.)	11616.67	7376.15	4240.52	1.92
Asset sold	0.02	0.05	-0.02	-1.68
Land purchased	0.02	0.02	0.00	-0.43
Non-food expenditure (Tk.)	42798.61	48116.02	-5317.42	-2.06
Expenditure on durable goods (Tk.)	3397.31	5292.50	-1895.19	-1.73
Food expenditure (Tk.)	451680.60	468534.71	-16854.11	-0.97
Annual education expenditure (Tk.)	863.99	751.45	112.54	1.16

Table 8: Impact of SSHE program on productive outcomes in Bangladesh, 2010

Outcome indicators	**Treatment**	**Control**	**ATT**	**t value**
Number of farm activities	0.49	0.44	0.05	0.58
Working hour per day	12.57	12.82	-0.24	-0.27
Number of non-farm activities	1.99	2.09	-0.10	-0.50
Self employed in farm activities	0.67	0.48	0.19	1.94
Self employed in non-farm activities	0.68	0.52	0.16	1.57
Salary of non-farm activity (Tk.)	42445.60	39268.58	3177.02	0.32
Income from crop production (Tk.)	29009.69	13230.51	15779.18	3.04
Income livestock production (Tk.)	6636.42	3208.88	3427.55	2.36
Value of agricultural assets (Tk.)	4621.59	2065.28	2556.31	1.72
Spending on fertilizer use (Tk.)	1877.87	1050.07	827.80	2.06
Total credit (Tk.)	25295.45	9766.08	15529.38	2.01
Asset sold	0.02	0.02	0.00	0.00
Land purchased	0.05	0.03	0.01	0.52
Non-food expenditure (Tk.)	60158.66	67770.31	-7611.64	-1.44
Expenditure on durable goods (Tk.)	11901.73	9090.35	2811.38	0.46
Food expenditure (Tk.)	580628.90	560395.39	20233.54	0.47
Annual education expenditure (Tk.)	2788.96	1829.33	959.64	2.83

Table 9: Impact of selected SNPs on productive outcomes

Outcome indicators	**OAA**	**AWDD**	**SPS**	**SSHE**	**All SNPs**
Number of farm activities	-	-	-	+	-*
Working hour per day	-	-	-	-	+
Number of non-farm activities	+	+	+	-	+*
Self employed in farm activities	-	-	+	+	-*
Self employed in non-farm activities	+	+	+*	+	+
Salary of non-farm activity (Tk.)	-	+	+	+	+*
Income from crop production (Tk.)	-	+	-	+*	-*
Income from livestock production (Tk.)	-	-	+	+*	-
Value of agricultural assets (Tk.)	+	-	-	+	-
Spending on fertilizer use (Tk.)	-	+		+*	-*
Total credit (Tk.)	+	+	+	+*	-
Asset sold	-	+	-	+	-
Land purchased	-	-	-	+	-
Non-food expenditure (Tk.)	-	-	-*	-	+
Expenditure on durable goods (Tk.)	+	-	-	+	-
Food expenditure (Tk.)	-	-	-	+	-
Education expenditure (Tk.)	-	-	+	+*	+

Note: '*'= Significant; NA = Not available

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