Does conditional cash transfer have any impact on private investment in human capital? A study on Bangladesh's female stipend programme

Saima Ansar Jui[1], Amin Masud Ali[2]

Abstract: Conditional Cash Transfers (CCTs) have become a major component of national developmentstrategies to alleviate existing poverty level and to break the intergenerational cycle of poverty transmission through stimulating household's investment decision in human capital. This study empirically investigates the impact of Female Stipend Programme (FSP) of Bangladesh on household's human capital investment decision, emphasizing on educational expenditure, food consumption expenditure and per capita calorie intake. Applying the Propensity Score Matching (PSM) Techniques the study came up with the findings that the treatment group (stipend recipient's family) shows a higher share of expenditure on food consumption out of total monthly expenditure and higher per capita calorie intake(per day) than the control group (families who does not receive any kind of transfer including the FSP) but contrarily the share of educational expenditure (out of total expenditure) is lower in the treatment group. There is also significant quintile wise variation of programme's impact across different income groups as our findings displays that in higher quintiles the stipend recipient families rather spend more on education out of their total income. Findings of this study has a significant policy implication as it justifies the validation and importance of this stipend programme.

1. Introduction

Conditional Cash Transfer programmes (CCTs) are identified as the most important component ơf national development strategies to ameliorate vulnerability, suffering and present poverty level and to facilitate human capital formation, across the Global South. Challenging neoliberalism, this southern revolution emphasized redistribution and provided direct cash to the poor people to use the economic opportunities to end their poverty in the short run and in the long run, break the intergenerational cycle of poverty. Since their first implementation in Brazil, Mexico and Bangladesh in 1997, their popularity grew rapidly and now, more than 110 million families are being directly benefited by those programmes (Hanlon et. al, 2010). At present, there are 130 low- and middle-income countries which have at least one unconditional cash transfer (UCT) programme and 63 countries have at least one conditional cash transfer (CCT)

---

[1]   Lecturer (adjunct), North South University, Dhaka, Bangladesh, Email: saimaansarjui@gmail.com

[2]   Associate Professor, Dept. of Economics, Jahangirnagar University, Savar, Dhaka, Bangladesh, Email: aminmasudali@juniv.edu, (Corresponding author)

programme (Hanlon et al., 2010) which indicates the importance of a deeper understanding of their effectiveness, mechanism of operation and improvements in programme design and implementation.

The literature on CCTs investigates many issues ranging from the quality of targeting to their impact on enrolment in the school and class performance, health, consumption, savings poverty, inequality, and gender empowerment. Very few researches have been done on beneficiary household's expenditure decision vis-à-vis changing attitude towards educational investment which is an important component of CCT. As the ultimate objective of CCT's, is creating human capital to break the intergenerational cycle of poverty, it is utterly crucial to study whether they increase the demand for educational services via increasing educational expenditures. This study attempts to bridge the gap in the literature, by investigating the impact of CCT on private investment decisions. This is important as changes in private expenditures in human capital can determine the outcome of the programs.

Evaluations show that educational cash transfer programmes usually have encouraging effects on schooling (enrolment, attendance, dropout) and improved nutrition, among the children who receive the transfers (Baird et al., 2014; Fiszbein and Schady, 2009; Behrman et al. 2005; Ganimian & Murnane, 2016; Benedetti et al, 2016; Schultz,2004). But, the effects on quality, e.g., academic and cognitive skills, which promotes human capital formation, remain unclear and challenge the effectiveness of CCT's in the long run (McEwan, 2015; Baird et al., 2014; Ganimian & Murnane, 2016). Also, the impact on private expenditure decision necessities to be rigorously understood

Soon after Bangladesh's independence in 1971, Qudrat -e-khuda foundation started providing cash transfer to the female students to encourage women's education. With time the objectives of the programme have been changed and the number of participants and amount of transfer also increased. In 2010, almost 25,00000 students benefited under the Stipend Programme. Nonetheless, a significant number of impact evaluation of the programme have been conducted on this Female Stipend Programme (FSP) in Bangladesh. But still, researches on the investment decision in human capital using household level data, covering the whole county, is absent in the literature.

This study empirically investigates the impact of educational CCT on household's private investment on human capital, more specifically on educational inputs, daily food calorie intake, and share of food consumption expenditure. We try to evaluate the impact of Stipend for Secondary and Higher Secondary/Female Student programme on the recipient household's expenditure decision on education, food consumption and daily calorie intake. A two-fold analysis is conducted – first a bivariate analysis to investigate the differences between the stipend recipient and non-recipient families in terms of a range of different socio-economic characteristics. Afterwards, we apply Propensity Score Matching (PSM) Techniques to evaluate the impact on the stipend programme on our outcome variables (share of educational expenditure, share of food consumption expenditure and calorie intake).

This study contributes to the literature in the following ways: First, although few aspects of Female stipend Programme in Bangladesh have been explored in the literature but its impact on private household expenditure decisions haven't been researched. In this study, we try to close this gap by identifying evidence based on household survey data. A second contribution is that we use PSM technique to capture the difference in

expenditures in education, food consumption and per capita calorie intake which shows the household's willingness and challenges in the decision to invest in human capital formation and how it varies within the capability hierarchy.

The rest of the paper proceeds as follows: section 2 provides the literature review; section 3 provides a detailed description of stipend programme. Research objective and methodology is discussed in section 4. Both descriptive and empirical analysis of the results are presented in section 5, including a subsection of the discussion of the findings. Finally, section 6 provides the concluding remarks.

2. Literature Review

According to Frank & Bemanke (2007) human capital is "an amalgam of factors such as education, experience, training, intelligence, energy, work habits, trustworthiness, and initiative that affect the value of a worker's marginal product". Both as a 'labor force' or 'creator' human capital affects all aspects of development, such as- individual's wage, productivity (Vinokur et al., 2000; Griliches & Regev, 1995; Lucas, 1988; Rosen, 1999; Denison, 1962; Schultz, 1961), firm's fundamental productive capabilities (Lepak & Snell,1999) and national economic growth (Romer, 1986). In this essay we investigated what is the impact of CCT's in human capital formation to ensure sustainable development.

Cash transfers have direct effect on the household (Fiszbein and Schady,2009) and spillover effect on the society (Kabeer & Waddington, 2015). Cash transfer immediately increases the disposable income of the household depending on several constraints and enablers e.g., family's assent base (land ownership, income, stock of human and social capital), labor productivity, livelihood strategies, demographic features (household size and composition), risk preference, intra-household dynamics, and external shocks (Bastagli et, al; 2016). The additional income may be used in food consumption, savings or investments in assets, and human capital. The strength of the effect depends on the generosity of the benefits, the degree of enforcement, and the conditions imposed (Baird et al., 2013). The cash transfers might shift the intra-household powerstructure and intra-household allocation of resources which might empower women and shift the investment decision towards human capital. Throughout the process, the household faces tradeoff for child labor/girls unpaid domestic work and opportunity cost of caring for younger siblings and mothers time devoted to the extra-household chores.

In the last two decades, there have been a significant increase in the manifestation of different CCT (Conditional Cash Transfers) programmes all around the world and as a consequence, an increased number of researches have been conducted to evaluate the impact of these intervention programmes. Systematic reviews indicate that they have an overall positive impact on economic outcome (Kabeer & Waddington, 2015) e.g., class attendance (Baird et al. 2012,Saavedra & Garcia, 2017), health facility and immunisation coverage (Lagarde et al., 2009; Gaarder et al. 2010), and child nutrition (Manley et al. 2012). Although studies claim that the magnitude of the impact varies with the nature of the programme (e.g., amount and timing of payment, selection criteria, conditions, and target group) and also on the features of target population e.g., age, gender, school grade, socioeconomic status, and location (Alam et al. 2011).

In case of educational upshots, CCT's have a significantly positive impact on the direct outcomes e.g., school enrolment, class attendance and reducing drop-out rates (Baird et

al., 2013; Kabeer et al., 2012; Bastagli, 2010; Schultz, 2004; Brauw and Hoddinott, 2011; Glewwe and Kassouf, 2012) and average effect sizes are larger in magnitude for secondary than for primary schooling (Saavedra and Garcia, 2017). Several studies have also found that CCT programmes in Brazil, Mexico, Nicaragua, and Paraguay has positive impact on grade advancement (Behrman et al., 2001; Maluccio and Flores,2005; Janvry et al., 2006). Contrarily, regarding long run impacts i.e., improving the quality of education and learning, the programmes show a relatively small positive impact (Baird et al., 2013). Besides, the positive direct or short run impactsdoes not necessarily render to better school performance (Bastagli, 2010). The increase in class size may lead to a lower accomplishment for the school because of larger student teacher ratio.The change in the orientation of student characteristics and lack of qualified teachers may increase in the number of under-achieving students (Heinrich 2007; Garcia and Hill 2010; Garza and Villarreal 2007; Ponce and Bedi 2010; Barrera, et al. 2016;, Sengupta and Todd 2000).

Regarding impact on consumption, Kabeer and Waddington (2015) found that that CCT programmes increased household consumption and improved consumption smoothing. This can be justified by the assumption that CCT's increase the income of poor and marginalised households, part/total of which may turn into consumption. (Attanasio et al., 2005). The result unambiguously confirms that transfer significantly increased the total consumption and food consumption expenditure of the household (Todd et al., 2010; Attanasio et al., 2011; Maluccio, 2007; Gitter and Caldes, 2010). Moreover, controlling the income effect, Hoddinott and Skoufias (2004) showed that PROGRESA increased the intake of calories from food. This programme also had a "platicas" effect, the participants could eat amore diverse diet which positively affected the behavior of non-beneficiaries. A number of studies in Latin America found that CCTs were undeniably effective in reducing income inequality and poverty (Barros et al. 2007, Sergei et al., 2007, Bastagli, 2010). Similarly, Cruz and Ziegelhöfer (2014) found a positive impact of CCT programme on household expenditure decisions on principal contributors to child human capital such as-nutrition, healthand education.

A significant number of studies have examined the impact of Bangladesh's intervention in social assistance. Using a fuzzy RD design, Mohammad (2014) estimated that anti-poverty programmes in Bangladesh increased the daily calorie consumption by 843 kcal (37%). Studies on female stipend programmes showed that it lessened the gender gap in school enrolment and educational attainment (Asadullah and Chaudhury; 2009; Khandker et al. 2003). The programme also increased women's marriage age and their participation in the labour force (Hong and Sarr, 2012). Sham (2015) & Sayeed (2016) showed positive impact on educational attainment. Contrasting evidence are also observed in number of studies. For instance, Heath and Mobarak(2012) found no significant effect of the female schooling subsidy on their enrolment. Studies have also pointed out that stipend amount is quite insufficientcompared to the out-of-pocket expenditure and the opportunity cost of attending school in Bangladesh (Ullah, 2013).

Studying the impact of transfer programme on private expenditure decisions is crucial since changes in decisions of household expenditure has an extravagant relevance with policy. However, till date, little is known about the long-term impacts on human capital accumulation and measures of human welfare (Filmer and Schady, 2009). Moreover, the research on the impact of CCT's is very skewed to Latin America and Caribbean countries compared to South Asia where most of world's poor people (45% of global

poor people) lives (Bank, 2012b). Thus, by choosing Bangladesh as a field of investigation this study contributes to reducing   the regional differences in the CCT literature.

3. Overview of the Female Stipend Programme (FSP)

Female Secondary Stipend Programme formally started in year 1982 by a national NGO, The Bangladesh Association for Community Education (BACE) under the supervision of the Asia Foundation and with USAID financial assistance in a single sub-district of Bangladesh. The pilot programme increased secondary enrolment in girls by 7.9 per cent to 14 per cent and drop-out rates fell from 14.7 to 3.5 per cent (Raynor and Wesson 2006). Observing this success, later, in 1994, Bangladesh government with launched the programme nationwide for girls in secondary school (grades 6–10), covering 70 percent of all 460 sub- districts, and 57 out of 64 districts. Now-a-days, stipends are also provided in grade11 and 12. The stipend programme till date is running in different name and with different financial assistance.

A female student needs to satisfy the following three conditions in order to receive the stipend - (a) school attendance rate has to be minimum 75%, (b) The student should obtain at least a 45% test score in the annual examination, and (c) have to remaining unmarried (Khandker et al. 2003). These criteria have been changed over the years. Similarly, the schools has to fulfill some condition e.g., get registered and participate in enrolment awareness programmes, issue warnings to girls if they do not fulfil the criteria, accept the rate of the tuition fees as fixed by the education ministry, cannot collect tuition fees from stipend recipients, and assign a unique ID and maintain a register (Bhatnagar et al., 2003). The stipend covers the tuition fees which is directly paid to the school where the student is enrolled. In addition, a book allowance in grade 9 and examination fee in grade 10 are included. The rest of the stipend is paid directly to the girls in two annual instalments in the form of deposits into savings accounts in the nearest state bank, called Agrani Bank (Khandker et al. 2003). The stipend amount also increases by grade. The objective of the FSP have also evolved over its lifetime. To increase enrolment and retention,delay marriage, reduce fertility, and increase employment are the most enduring objectives ofthe programme.

4. Objective and Methodology

The objective of this study is to assess the impact of the educational Conditional Cash Transfer (CCT) programmes on household's human capital investment emphasizing on household's decision on education and food consumption expenditure and per capita calorie intake. More specifically the study investigates the impact of the educational CCT on household's share of educational and food consumption expenditure out of total expenditure and per capita calorie intake. This study concentrates on a particular CCT programme – Female Stipend Programme (FSP) of Bangladesh. In this programme, stipend is provided in form of cash to poor female students who are enrolled in secondary and higher secondary level.

To evaluate the impact of the stipend, programme the following hypotheses are tested:

> *Hypothesis 1: Treatment group's (stipend recipient student's family) share of annual educational expenditure out of total expenditure is higher than the control group (non-recipientstudent's family)*

Hypothesis 2: Treatment group's share of monthly per capita food consumption expenditure out of total expenditure is higher than the control group.
Hypothesis 3: Treatment group's per capita calorie intake per day is higher than the control group.

4.1 Estimation technique
This study uses Household Income and Expenditure Survey (HIES, 2010) data set as the main source. The survey conducted by the Bangladesh Bureau of Statistics (BBS) which provides vast information on the demographic and socio-economic condition of survey households.
To evaluate the impact of the stipend programme, first, a descriptive analysis is conducted to investigate the differences between the treatment and the control group regarding the determinants of household's expenditure decision (on education, food consumption and calorie intake). Secondly, we have tried to evaluate the impact of the programme using non-randomized approach instead of experimental methods, as in our case, the programme had already been implemented before evaluation. So, we had to depend on non-randomized approach and constructed a comparison group based on PSM. The PSM approach construct's a propensity score or index to identify the effects of different observed covariates on participation and then compare the outcomes of participating and non-participating individuals with similar propensity scores to obtain the programme effect (Heckman et al., 1998). The theoretical framework of this approach is as following:
Say, $Y_i(1)$ and $Y_i(0)$ be the outcome of the programme beneficial and program non-beneficial household respectively. The impact of the programme can be written as: $\Delta = Y_i(1) - Y_i(0)$, where $Y(1)$ or $Y(0)$ is detained outcome for every household. Now, let D indicate whether the household participates in the programme so, $D = 1$ if the household is selected for the programme; $D = 0$ otherwise and let X is the vector of all control variables. Then, the average impact of the programme can be shown as-
$E(\Delta \mid X, D = 1) = E[Y(1) - Y(0) \mid X, D = 1] = E[Y(1) \mid X, D = 1] - E[Y(0) \mid X, D = 1]$
….(1)
In equation (1) the problem is the expression $E[Y(0) \mid X, D = 1]$ is not observed. To solve it, PSM provides one method for estimating this counterfactual outcome for participants (Rosenbaum and Rubin 1983). Say, the probability of participation in the programme is: $P(X) = \Pr(D = 1 \mid X)$. PSM constructs a statistical comparison group by matching observations between the two groups with similar values of $P(X)$. This technique requires two assumption which are:

$$E[Y(0) \mid X, D = 1] = E[Y(0) \mid X, D = 0] .... (2)$$

$$\& \ 0 < P(X) < 1 .... (3)$$

The first assumption is known as "conditional mean independence" assumption. The 2nd assumption shown by equation (3), ensures valid matches by assuming that $P(X)$ is well defined for all values of X. Covariate matching methods used in PSM estimates $E[Y(0) \mid X, D = 1]$ by $E(Y0 \mid X, D = 0)$ using the mean outcomes of comparison households matched with beneficiaries directly on the X variables.
Therefore, in PSM, a probabilistic model is constructed first to calculate each individual's

probability of participating in the stipend programme usingsome observed characteristics which we believe affects the participation but are not affected by the programme itself. On the basis of the probability or propensity score a non-participant control group is constructed which is matched with the programme participants. At the end, the average of the outcome variable (expenditure on education) is calculated for both the control and treatment group. The difference of the average value showsthe impact of the programme. So, in PSM, a quasi-experimental approach is followed which constructs comparable treatment and comparison groups using covariate and propensity score matching.

In our context, the dependent variable (receives stipend or not) is a binary variable so logit or probit model is applied for the whole sample (pooling the participants and non-participants together) and all the observed covariates are estimated. The matching strategy applied in PSM requires that the outcome variable(s) must be independent of treatment conditional on the propensity score. Moreover, to confirm that the variables are unaffected by participation in the programme, they should be either constant over time or measured before participation (Caliendo& Kopeinig, 2008). Finally, researchers have also shown PSM provides a reliable and low bias estimates of programme impact if - crucial variables are not omitted, same data source or survey instrument is used for both groups and both the groups have access to the same markets, and finally, when the sample of eligible nonparticipants is large (see Heckman et al., 1997; 1998 for details).

These requirements are satisfied in this study as HIES survey is a comprehensive survey which meets these criteria. From the same round of survey both participants and non-participants are taken. In addition, because of the wide coverage of the HIES survey and as our sample size is quite large (which is 4930) we can expect minimum bias. Now, as the stipend programmes have been operating for a long time, the assumption of variable unaffected by participation is not appropriate here. Therefore, while selecting variable it is assumed that they are fixed over time. The variables included in the survey includes several determinants of participation, which helps us to reduce potential bias in PSM estimators. In this study, matching is done on the basis of observable characteristics and we assume that unobservable and observables have the same distribution.

Ultimately the economic theory and related studies were used to select the variables that determine female school enrolment decision and probability of receiving the stipend. Among the individual level characteristics we have included age (also square of age), religion, child labour, marital status in our study. To capture the socio-economic determinants, this study used several variables such as – parent's level of education, earning status, per capita food consumption expenditure, poverty level (upper and lower poverty line), dwelling features (access to safe water and improved sanitationfacility), and land holding. Moreover, dependency ratio and number of members in the household are included to capture how these affect the schooling decision. Region (urban or rural) and Stratum dummies were included to control the region specific unobservable effects (e.g., difference in access to school or commodity price). A complete list of our outcome variables and control variables or covariates in provided in Table A1 in Appendix. In this study, we have applied PSMATCH2 command in STATA and used Neatest Neighbor Machining technique.

Literature shows that studies on educational CCT's have considered *Age* as the selection instrument. In case of Bangladesh due to late entry, repetition and other factors the range of ages varies a lot. Therefore, we have taken *Class or Grade* as our selection instrument.

First, we have only considered students (5653 in total) who were currently enrolled in class 6 to 12 in 2010 (the survey year). Then, we identified those who receives only secondary and higher secondary stipend (the treatment group) and those who does not receive any kind of benefits (the control group). The control group comprises of 4792 students, on the other hand, 273 students receive the secondary and higher secondary stipend among which we have finally considered 241 female students as out treatment group because in this study we are interested to analyse the impact of the programme on female students. Besides the programme was initially entitled to target female students only and later male students were included. So, after deducting the male students who receives the stipend, the size of the treatment group becomes 241 and the total sample size stands at 5033. Figure 1 (below) shows the analytical framework.
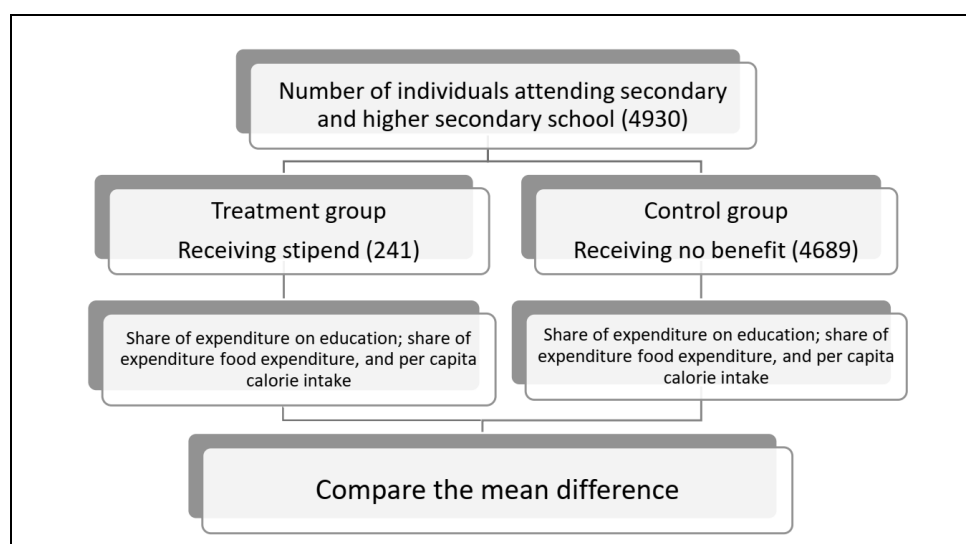

Figure 1 Analytical framework of PSM, (Source: Own Construction)

5. Result

In the section, first, the descriptive analysis is provided which shows the average or mean difference between the control (stipend non-recipient) and treatment (stipend recipient) group. Then we have applied econometric method (Propensity Score Matching techniques) to evaluate the treatment effect of the programme and the results are proved. This section also contains a robustness analysis to validate the PSM scores.

5.1 Descriptive findings

The descriptive analysis to compares between our treatment (those who receives stipend) and control group (stipend non-recipient). Table A2 (see appendix) shows the distribution of stipend receiving and non-recipient students by their residence, food consumption quintiles and grade or class enrolment where 69.29% students are from rural area and 30.71% are from urban area. Considering the level of income, the highest number of participants (28.63%) comes from the lowest income group in terms of food consumption quintile. While 14% recipients come from the richest quintile. Table A3 (see appendix) shows the self-reported amount of stipend provided to the students in each grade or class

and as well as the self-reported total educational expenditure in each grade (self-reported, obtained from the questionnaire survey). The amount of stipend covers less than 10% of the total education expenditure for the overall sample. In class or grade wise comparison, we found that the stipend covers about 16.05% expenses at class-Six and the lowest around 3.7% at Grade-Twelve. We find that higher amount of stipend is provided in higher classes but still these amounts less than the higher actual expenditure that occurs especially in the upper classes.

We have concentrated mainly on three variables - share of educational expenditure out of total annual expenditure, share of food expenditure out of total monthly expenditure and calorie intake per capita per day, to investigate the impact of stipend on investment on human capital. Table A4 (see appendix) shows the mean difference of these variables between treatment (stipend recipient) and control (stipend non-recipient) group. The programme has a significant positive impact on the share of food expenditure as we find that the share of per capita food consumption expenditure (out of total per capita monthly expenditure) is higher for treatment group (about 57%) compared to the control group (about 53%). The difference (3.3%) is also statistically significant at 1% level of significance. On the other hand, the share of educational expenditure is slightly lower for the treatment group compared to the control group (the difference is only 0.39%) and same is the case for calorie intake per capita per day (treatment group consumes on average 45 kilo calorie less than the control group).

Table A5 (see appendix) provides a scenario of the difference in annual educational expenditure in terms of household's location (rural vs. urban) and recipient's current class or grade where the average annual expenditure in education in each class is higher in urban areas than in rural areas and the treatment group spends less than the control group. Similar is the case for urban area with an exception of participants of the stipend programme of class 9 & 11 spend more than the non-participants on an average. Quintile (food consumption quintile) wise variation in educational expenditure between the treatment and control group is presented in Table A6 (see appendix). We find that for all the quintiles treatment group households spend less in education compared to the control group. Though the differences are not statistically significant except for the 1st quintile. Furthermore, Table A7 (see appendix) displays the breakdown of the annual educational expenses in different categories (based on the questionnaire) and the difference between the treatment and the control group. Overall, we find that the total expenditure on education is lower for treatment group compared to the control group (by 3469.314tk) and the difference is also statistically significant.

Table A8 (see appendix) illustrates that the average food consumption expenditure is 1351tk less in rural area and 1638tk less in urban area. The differences are statistically significant at 5% level of significance. Table A9 (see Appendix) shows that the monthly per capita food expenditure increases as we move from the poorest to the richest quintiles.

Finally, the variation in per capita per day calorie intake across location (urban and rural) and across different class or grade in presented in Table A10 (see appendix). Rural treatment group consumes 2418.94 Kilocalorie against 2237.36 kilo- calorie consumed by the urban treatment group. On the other hand, rural control group consumes 2461.91 kilocalorie which is higher than the calorie consumed by the urban control group (which is 2335.672 kilo-calorie). In the quintile analysis, Table A11 (see appendix) we also

observe that calorie intake increases gradually from the poorest to richest quintile for both the treatment and control households. So, we conclude that in the middle and top quintile stipend has a positive impact on calorie intake.

Overall, descriptive results show that the treatment group's share of food consumption expenditure is significantly higher than the control group. Conversely, the share of education expenditure and calorie intake is lower for the treatment group. However, without controlling the covariates, any robust conclusion cannot be drawn. Therefore, we use the propensity score matching technique. The results are provided in the following section.

5.2 Propensity score matching (PSM) scores

Table 18 shows the PSM scores. We find that the overall impact of educational CCT (Female Secondary and Higher Secondary Stipend) on investment in education is positive, although the magnitude is very small (0.0011) and not statistically significant. The result implies that stipend recipient family's share of educational expenditure out of total expenditure is relatively higher compared to non-recipient families share of educational expenditure. Moreover, results show that there is quintile wise variation in the treatment effect. In the lowest three quintiles we find that treatment group's share in educational expenditure is rather lower than the control group and in the upper two quintiles (4th and 5th) it's the opposite.

Table 1 Impact of Educational CCT (Using PSM Technique)

Outcome Variable		Treatment	Control	Difference
Share of Educational Expenditure out of total annual expenditure	Overall Sample	0.0401	0.0390	0.0011
	Quintile 1	0.0381	0.0400	-0.0019
	Q2	0.0381	0.0445	-0.0064
	Q3	0.0421	0.0563	-0.0142
	Q4	0.0460	0.0360	0.0101
	Q5	0.0398	0.0369	0.0029
Share of food consumption expenditure out of total monthly expenditure	Overall Sample	0.5681	0.5589	0.0091
	Quintile 1	0.6014	0.5781	0.0233
	Q2	0.5412	0.5620	-0.0208
	Q3	0.5663	0.5257	0.0406
	Q4	0.5365	0.5750	-0.0385
	Q5	0.5774	0.5276	0.0498
Per capita per day calorie intake	Overall Sample	2363.1831	2318.2592	44.9239
	Quintile 1	1959.8049	1933.4330	26.3718
	Q2	2337.1613	2358.5413	-21.3800
	Q3	2497.2596	2365.6068	131.6528
	Q4	2531.3426	2595.3104	-63.9678
	Q5	2928.7478	3005.8437	-77.0959

Regarding share of food consumption expenditure, we find that the treatment group's share of food consumption expenditure is relatively higher than the control group (by 0.0091) implying that educational CCT has a positive impact on share of food consumption. Moreover, quintile wise distribution also shows similar finding with the exception of quintile two and four where the treatment group's share is lower than the control group. But in all other quintiles we observe that treatment group expends more on food compared to control group.

Considering per capita calorie intake per day, we find that treatment group's calorie intake is higher than control group (by 44.924 kilo calorie) which also indicates that cash transfers have a positive impact on calorie intake. Focusing on the quintile wise variation we find that in the lower quintiles treatment group's calorie intake in relatively higher than the control group though in the upper quintile the opposite result is observed.

5.3 Robustness Checks
Our first attempt of testing the robustness of the findings consists of applying the alternative matching techniques of propensity score matching and providing the graphical representation (of the common support area). Table A12 (see appendix) give us the scores when all the alternative approaches of PSM (e.g., nearest neighbour matching, stratification matching, radius matching, and kernel matching). We find that the impact of stipend on share of educational expenditure varies from 0.001 to -0.004 (see column 1, Table 21). The nearest neighbour matching technique shows that the treatment group shows 0.1% higher share of educational expenditure compared to the control group. But contrarily, all the other techniques show that treatment group's educational share is rather lower. As a result, we cannot draw a robust conclusion here and we conclude that stipend does not have any robust impact on share of educational expenditure. In case of share of food consumption expenditure, we find that (see column 2) treatment group shows 0.1% to 2.9% higher share in food consumption expenditure. Now, for the variable calorie intake per capita per day, we find that (see column 3) treatment or stipend recipient families consume on average 12.19 to 44.92 kilo-calorie per capita per day higher than the control group (non-recipient families).

Next, we test whether the assumption regarding common support (the region where distributions of the propensity score for treatment and comparison group overlap) is fulfilled or not. The basic criterion is to exclude all observations where the propensity score is smaller than the minimum and larger than the maximum in the opposite group. This ensures treatment observations have comparison observations "nearby" in the propensity score distribution (Heckman et at., 1999). Figure 2 (below) shows the graphical evaluation of the quality of matching of propensity scores. We use the command 'psgraph' after 'psmatch2' command in STATA which shows the comparison of the treated (in gray colour) and untreated (in black colour) individuals. The figure shows that there were no cases of off-support though there is some evidence of overlapping propensity scores. The second diagram further confirms that none of the treatment observations falls outside the overlap area or the region of common support.
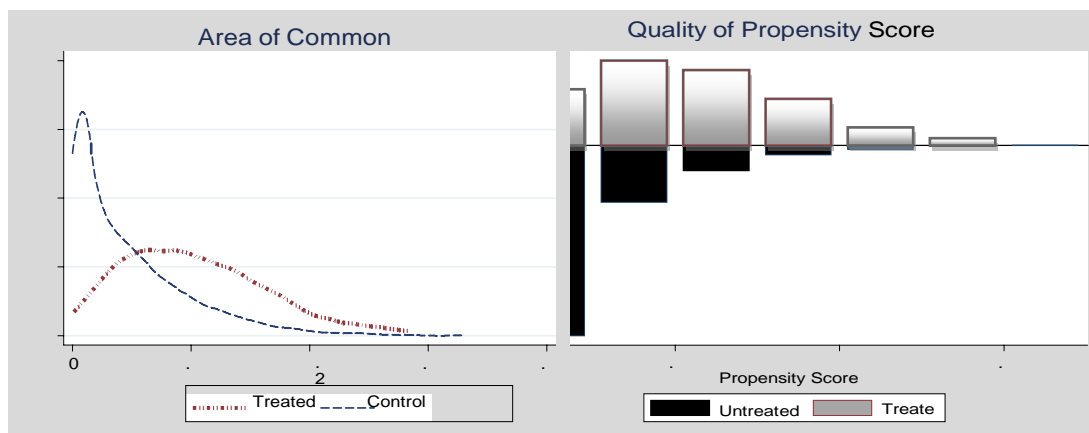
Figure 2 Quality of Match (showing the Common Support Area)

Besides the graphical presentation, we have also conducted the statistical test of the propensity scores by using 'pstest' command in STATA. This command helps us to test whether the covariates or control variables are balancing or not. The test results are presented in Table A13 (see appendix). The table shows the t-tests for equality of means in the two samples. T- tests are based on a regression of the variable on a treatment indicator. Moreover, we find that the standardised % bias (i.e., the % difference of the sample means in the treated and non- treated (full or matched) sub-samples as a percentage of the square root of the average of the sample variances in the treated and non-treated groups) in few cases are greater than 5% which is the common threshold, but the differences are not statistically significant. The overall mean bias is less than 5%. The table also shows the variance ratio (only for continuous covariates) of treated over non-treated. We find that in most cases the ration is equal to 1 which indicates there is perfect balance. Only two variables (land holding and per capita food expenditure) have variance ratios that exceed the 2.5th and 97.5th percentiles of the F-distribution.

In our third approach of robustness checking, we apply a regression analysis to investigate the impact of stipend on educational expenditure, food consumption and calorie intake. Following a similar specification used by Hoddinott and Skoufias (2005), we apply a linear regression analysis on the following model: $ln\ Y_i = \alpha + \beta\ Stipend_i + \lambda\ Xs + u_i$; where, $ln\ Y_i$ is the log of dependent variable (separate models are applied for the three dependent variables- annual education expenditure, monthly consumption expenditure, and per capita calorie intake per day. $Stipend_i$ is a binary variable holding the value 1 if the student receives stipend. We have also included a set of control variables denoted by X in the equation. The control variable includes age, sex, religion, marital status and location (rural or urban) of the student; Parent's age, level of education and earning status; socio-economic condition of the household (shown by per capita income, per capita consumption expenditure, land holding, poverty status, number of dependents) and also dwelling features (e.g., access to electricity and improved toilet, room material, existence of separate kitchen and separate dinning). Moreover, to control the unobservable heterogeneity across the households we have included 15 Stratum dummies out of total 16 Stratums (one excluded as base category). A brief description of the

selected variables is provided in the Table A1 appendix.

Regression results are provided in Table A14 (see appendix). From column-1 we find that stipend recipient student's family (treatment group) shows higher educational expenditure (by 7.4 units or taka) compared to the non-recipient student's family (control group). The coefficient is not statistically significant though. In our second specification (shown in column 2, Table 23), we find that treatment group shows higher monthly per capital food consumption compared to the control group. Result confirms that stipend helps to spend the recipients 1.27 units or taka more on monthly per capita food consumption. Regarding our 3rd variable calorie intake per capita per day, we find that stipend recipient student's family members consume 2.04 kilo calorie (per day) more than the non-recipient student's family members (see column 3). Again, the coefficient is relatively small than the PSM score, but the sign confirms that stipend has a positive impact on per capita per day calorie intake. As it is quite impossible to control the impact of the unobservable heterogeneity among the individuals, we obtain smaller coefficients in regression compared to PSM scores.

5.4 Discussion of the results

In this section, we discuss our major findings, try to understand the socio-economic reasoning behind the outputs and examine whether these results support or contradict existing literature. First, we focus on the descriptive analysis. It is unfortunate that although having a lower- middle income status and being one of the pioneering countries to implement CCTs, in our sample (of 5033 female students) only 5% students receive the benefit. Dividing the stipend recipients and non-recipients in terms of income status (measured by food consumption quintiles) we have found that a significant number of students (15%) from the richest quintile are receiving the stipend which indicates that the exclusion criteria is not strictly maintained. Regarding the amount of stipend distributed to each recipient, the study shows that the amount only covers less than 10% of the total educational expenditure. Though higher amount is provided to higher grades still the amount of the stipend is not adequate to cover the educational expenses.

Considering our main variables of interest, the bivariate analysis shows that for the overall sample, the treatment households have a relatively higher share of food consumption expenditure out of total monthly expenditure compared to the control households. But the share of educational expenditure (out of total expenditure) and per capita calorie intake (per day) is rather lower compared to the control group. This implies that stipend recipient family's expenditure share on food consumption is higher but expenditure share on education and calorie intake is comparatively lower than the non-recipient families. Which is intuitive, because the poor spends higher share of their income in basic need than luxury goods-such as education (Cruz and Ziegelhöfer, 2014). However, results of the bivariate analysis do not show the actual impact of the intervention as there are wide variation within our treatment and control group which needs to be controlled. Therefore, we need to derive the impact based on advanced impact evaluation technique e.g., PSM technique or double difference method which are widely used in the literature (Ninno and Dorosh, 2002; Ullah, 2013).

We have applied the Propensity Score Matching (PSM) technique to our household income and expenditure-2010 dataset to evaluate the impact of the female stipend programme and test our hypotheses. Result confirms that impact of educational CCT

(Female Secondary and Higher Secondary Stipend) on investment in education is positive but statistically insignificant. We found that stipend recipient family's share of educational expenditure out of total expenditure is slightly higher compared to non-recipient families share of educational expenditure. Although the impact is very small (0.1% higher). The robustness check analysis also confirms that stipend does not have a robust impact on the share of educational expenditure. Therefore, we reject our first hypothesis that stipend recipient household's share on educational expenditure out of total expenditure is higher than the non-recipient household's share of expenditure. However, result further confirms that there is quintile wise variation in the treatment effect and among the extreme poor families the impact of stipend on educational expenditure is not positive but with the increases of income the families start to spend more on education.

Irrespective of this finding, our analysis also came up with the result that non-mandatory educational expenditure like stationary, book fees, other expenses, transportation etc. spending is higher among the treatment group compared to the control group which indicates that stipend helps the families to spend on education. Summing up all the non-mandatory costs, we find that treatment group spends more on education compared to control group (by Tk. 43). Therefore, the impact of the stipend programme on education does have some positive significance.

Regarding our second hypothesis, we found that treatment group's share of food consumption expenditure out of total expenditure (per capita) is relatively higher than the control group (by 0.1% to 2.9%, depending on the matching technique) implying that educational CCT has a positive impact on share of food consumption. Moreover, quintile wise distribution also shows similar finding. The results are consistent for all alternative matching techniques which were applied as a part of robustness checking. Again, rather than taking the share, we consider the total consumption expenditure, and once more, we obtain the same result that treatment group shows higher monthly per capita food expenditure (by Tk. 69.57) and higher monthly per capita total consumption (by Tk. 73) than the control group. This confirms that the average monthly stipend amount (which is around Tk. 74) helps the treatment group to spend more on consumption (especially on food consumption) compared to similar families those who do not receive stipend. This result supports previous studies (Todd et al., 2010; Attanasio et al., 2005; Maluccio, 2007; Gitter and Caldes, 2010; Angelucci and Attanasio, 2006; Rubalcava et al. 2009).

Considering the third outcome variable- per capita calorie intake per day, our result shows that treatment group's calorie intake is higher than the control group (by 44.924 kilo calorie) which also indicates that cash transfers have a positive impact on the acquisition of calorie. Focusing at the quintile-wise variation, we find that in the lower quintiles, treatment group's calorie intake in relatively higher than the control group, though in the upper quintile the opposite result is observed. Alternative matching techniques also confirm our result. Therefore, this result confirms our third hypothesis that the stipend recipient household's per day per capita calorie intake is higher than the similar non-recipient families. Similar results found by Ninno and Dorosh (2002).

6. Conclusion

In 1990s, the failure of the Washington Consensus and Structural Adjustment Programmes (SAPs) in several developing countries, fostered the southern response for

cash transfers. This popular instrument to address poverty has proven to be successful in the short and medium term. To be effective in the long run, there must be a positive effect on private investment decision in human capital or at least, the private expenditure on those amenities should be increased. In such context, this study empirically investigates the impact of secondary stipend programme of Bangladesh on household's human capital investment decision emphasizing on educational expenditure, food consumption expenditure, and calorie intake. Our analysis shows that with the improvement of economic status, families start to invest larger share of income into food consumption and calorie intake. However, the study failed to draw any robust conclusion regarding stipend's impact on education expenditure. Besides the empirical findings, this study has also observed some pitfalls in the design of the programme. The current selection criteria is very subjective in nature and it itself is a source of weak targeting. Also, the amount of transfer is insufficient to cover the direct educational costs. As a result it fails to keep the participant within the school and the amount of stipend mainly contributes to the consumption expenditure of the poor.

The study itself also contains some limitation of its own. For instance, as the empirical results are based on PSM scores depend on a careful selection of the covariates which influence the probability of participation in the programme. If there are variables outside the estimation equation which also affects the participation, PSM results will be biased. Now this condition cannot be directly tested. A careful examination was put in to select the variables but still there may be some unobservable factors that were not considered. An alternative of PSM is to use double difference method. Time constraint and unavailability of previous data did not permit us to conduct such study. Another issue is the whole study depended on HIES survey data. The consumption expenditure and income data are obtained by recall method (respondents had recall the past expenditure) which creates cases of underreporting or over reporting. Unavailability of alternative nationwide data set does not permit us to validate the HIES data.

Irrespective of these limitations, this current study makes a significant contribution in the existing country literature as so far, a very little attention was paid to investigate the long run impact of the programme in a comprehensive manner. Finding of this study also have a significant policy relevance. Positive short and long run effect of this programme provides a strong rationale to maintain and if possible, increase government's allocation in educational CCT. For a country like Bangladesh, this FSP programme is relatively expensive, but such positive outcomes prove that the money has not been wasted. It can improve the socioeconomic status of the women and change household's investment decisions.

References

Angelucci & G. De Giorgi. (2009). indirect effects of an aid program: How do cash transfers affect ineligibles' consumption? *The American Economic Review*, Vol. (99:1). pp. 486-508

Attanasio, O., Battistin, E. & Mesnard, A. (2011). Food and cash transfers: Evidence from Colombia. *The Economic Journal*, pp. 122:92

Attanasio, O., Battistin, E., Fitzsimons, E., Mesnard, A. & Vera-Hernandez, M. (2005). How Effective Are Conditional Cash Transfers? Evidence from Colombia." Briefing Note 54. IFS.

Asadullah, MN. & Chaudhury, N (2009). Holy alliances: public subsidies, Islamic high schools, and female schooling in Bangladesh. *Education Economics*, Vol. (17:3). pp. 377-394.

Bangladesh Bureau of Statistics (2011b). Report on Household Income and Expenditure Survey, 2010, Dhaka. Bastagli (2010). Poverty, inequality and public cash transfers: Lessons from Latin America. Technical report, Background Paper for the European Report on Development (ERD) 2010 on Social Protection for Inclusive Development.

Baird, C. McIntosh & B.Ozler (2011). Cash or condition? Evidence from a cash transfer experiment. *The Quarterly Journal of Economics*. Vol. 126:4. pp. 1709-1753.

Barrera-Osorio, F., Linden, L., & Saavedra, J. E. (2016). Medium term educational consequences of alternative conditional cash transfer designs: Experimental evidence from Colombia. Unpublished manuscript, National Bureau of Economic Research, Cambridge, MA.

Benedetti, F., Ibarrarán, P., & McEwan, J.P. (2016). Do Education and Health Conditions Matter in a Large Cash Transfer? Evidence from a Honduran Experiment. *Economic Development and Cultural Change.* Vol. (64). pp. 759-793

Behrman, J. and Hoddinott, J. (2004). Program Evaluation with Unobserved Heterogeneity and Selective Implementation: The Mexican PROGRESA Impact on Child Nutrition. Mimeograph, International Food Policy Research Institute, Washington, DC.

Behrman, J. R., Sengupta, P. and Todd, P. (2005). Progressing Through PROGRESA: An Impact Assessment of a School Subsidy Experiment in Mexico. *Economic Development and Cultural Change*. Vol. (54:1) pp. 237-275.

Barham, T., Macours, K., & Maluccio, J. A. (2013). More schooling and more learning? Effects of a three-year conditional cash transfer program in Nicaragua after 10 years. IDB Working Paper Series. IDB-WP-432.

Behrman, J. R., Parker, S. W., & Todd, P. E. (2005). Long term impacts of Opprtunidades Conditional Cash Transfer Program on rural youth in Mexico. Unpublished manuscript.

Caldwell J, McDonald P. (1982). Influence of maternal education on infant and child mortality: levels and causes. *Health Policy Educ*. Vol. (2:3–4). pp. 251–67.

Caliendo, M & Kopeinig, S, (2008). Some practical guidance for the implementation of propensity score matching, *Journal of economic surveys*, Vol. (22:1), pp. 31-72.

Cruz, M. and Ziegelhofer, Z. (2014). Beyond the income effect: impacts of conditional cash transfer programs on private investments in human capital (English). Policy Research working paper; no. WPS 6867. Washington, DC: World Bank Group.

Denison, E. F. (1962). The Sources of Economic Growth in the United States and the Alternatives before Page 13 of 15 Us. NY: Committee for Economic Development.

De Janvry, A., Finan, F., Sadoulet, E., and Vakis, E. (2006). Can Conditional Cash Transfer Programs Serve as Safety Nets in Keeping Children at School and from Working When Exposed to Shocks? *Journal of Development Economics* Vol. (79:2) pp. 349–73.

De Barros, Cavalho, M. Franco, S. and Mendonca, R. (2007). A Queda Recente da Desigualda de Renda no Brasil. Dubois, P. and Rubio-Codina. M. (2012). Child Care Provision: Semi parametric Evidence from a Randomized Experiment in Mexico. *Annales d'Economie et de Statistique* 105–106: 155–84.

de Brauw, A. & Hoddinott, J. (2011). Must conditional cash transfer programs be conditioned to be effective? The impact of conditioning transfers on school enrollment in Mexico. *Journal of Development Economics*, Vol. (96:2), pp. 359-370

Ferreira, F., Filmer, D., & Schady, N. (2009). Own and sibling effects of conditional cash transfer programs: Theory and evidence from Cambodia. (Policy Research Working Paper no. 5001). Washington, DC: World Bank.

Fernald, C.H., Paul J Gertler, P.J., and Neufeld, L.M. (2008). Role of cash in conditional cash transfer programmes for child health, growth, and development: an analysis of Mexico's Oportunidades. *Lancet*. Vol. (371) pp. 828–37

Filmer, D. & Schady, N. (2008). Getting girls into school: Evidence from a scholarship program in Cambodia. *Economic Development and Cultural Change*. Vol. (56:3). pp. 581-617

Fiszbein, F. N. Schady, A. Ferreira, M. Grosh, N. Kelleher, P. Olinto, and Skouffas E. (2009). Conditional Cash Transfers: Reducing Present and Future Poverty (Policy Research Reports). World Bank Publications.

Frank, R. H., & Bernanke, B. S. (2007). *Principles of Microeconomics* (3rd ed.). New York: McGrawHill/Irwin.

Fuwa, N. (2001). The net impact of the female secondary school stipend program in Bangladesh. Unpublished manuscript.

Garcia, S., Hill, J.H. (2010). Impact of conditional cash transfers on children's school achievement: evidence from Colombia October 2009. Journal *of Development Effectiveness* Vol. (2:1) pp.117-137

Gaarder, M., Glassman, A. and Todd, J.E. (2010). Conditional Cash Transfers and Health: Unpacking the Causal Chain. *Journal of Development Effectiveness*. Vol. (2) pp.50

Garza, M., de Coahuila, G., Villarreal, J. (2003).   Do Conditional Cash Transfers Affect Poor Students' Performance? EGAP / ITESM Campus Monterrey

García, S. & Saavedra, J.E. (2017). Educational Impacts and Cost-Effectiveness of Conditional Cash Transfer Programs in Developing Countries: A Meta-Analysis. *Review of Educational Research*. Vol. (87:5). pp 921-965.

Ganimian, A.J. and Murnane, R.J. (2016). Improving Education in Developing Countries: Lessons From Rigorous Impact Evaluations. *Review of Educational Research*. Vol. (86:3) pp. 719 – 755

Glewwe, P. and Kassouf, A.L. (2012). The impact of the Bolsa Escola/Familia conditional cash transfer program on enrollment, dropout rates and grade promotion in Brazil. *Journal of Development Economics*, Vol. (97:2) pp. 505-517

Glewwe, P. and Olinto, p. (2004). "Glewwe and Olinto (2004).pdf." Final Report for USAID.

Gitter, S.R. and N. Caldés (2010) Crisis, Food Security, and Conditional Cash Transfers in Nicaragua. Towson University, Department of Economics, Working Paper No. 2010-07.

Griliches, Z. & Regev, H. (1995). Firm Productivity in Israeli industry 1979-1988. *Journal of Econometrics*, Vol. (65). Pp. 175-203.

Hanlon, J., Barrientos, A. and Hulme, D. (2010). *Just Give Money to the Poor: The Development Revolution from the Global South.* Sterling, VA, USA:

Heckman, JJ, LaLonde, RJ & Smith, JA, (1999a). The economics and econometrics of active labor market programs. *Handbook of labor economics*, Vol. (3). pp. 1865-2097

Heckman, J.J., Ichimura, H. & Todd, P. (1998a). Matching as an econometric evaluation estimator. *Review of Economic Studies*, Vol. (65:2) pp. 261-294.

Heath, R., and Mobarak, A. (2012). Does Demand or Supply Constrain Investment in Education? Evidence from Garment Sector Jobs in Bangladesh.

Heinrich, C.J. (2007). Demand and Supply-Side Determinants of Conditional Cash Transfer Program Effectiveness, *World Development*, Elsevier, vol. (35:1). pp. 121-143

Heinrich, C. J. (2007). False or fitting recognition? The use of high-performance bonuses in motivating organizational achievements. Journal of Policy Analysis and Management, Vol. (26). Pp. 281-304.

Hernandez, E. (2009). Impact of Conditional Cash Transfers and Remittances on Credit Market Outcomes in Rural Nicaragua. *Agricultural and Applied Economics Association*. Vol. (4)

Hong, S.Y. and Sarr, L.R. (2012). Long-term Impacts of the Free Tuition and Female Stipend Programs on Education Attainment, Age of Marriage, and Married Women's Labor Market Participation in Bangladesh. World Bank Working Paper 81061.

Hoddinott, J. and Skoufias.E. (2003). The Impact of PROGRESA on Food Consumption. In FCND Discussion Paper 150. Washington, DC: IFPRIIEG, 2014. Social Safety Nets and Gender Learning from Impact Evaluations and World Bank Projects. World Bank.

Jalan, J., & Ravallion, M. (2003). Estimating the benefit incidence of an antipoverty program by propensity-score matching. *Journal of Business and Economic Statistics*, *21*(1), 19–30.

Kabeer, N., L. Taylor, C. P. (2012). *What are the economic impacts of conditional cash transfer programmes? A systematic review of the evidence* (Technical report. EPPI-centre). Social Science Research Unit, Institute of Education, University of London, London.

Kabeer, N., Waddington, & Hugh. (2015). Economic impacts of conditional cash transfer programmes: a systematic review and meta-analysis. *Journal of Development Effectiveness*, *7*(3), 290–303.

Khandker, P., SR, M.M., & Fuwa, N. (2003). Subsidy to Promote Girls Secondary Education: The Female Stipend. In *Program in Rural Bangladesh, Munich Personal RePEc Archive (MPRA) paper* (Vol. 23688).

Khandker, S., Pitt, M., & Fuwa, N. (2003). "Subsidy to promote girls" secondary education: the female stipend program. In *Bangladesh. MPRA paper.* 23688, University Library of Munich, Germany

Lagarde, M., Haines, A., & Palmer, and N. (2007). Cash Transfers for Improving Uptake of Health Interventions in Low- and Middle-Income Countries. *JAMA.* Vol. (298:16): 1900–1910

Lucas, R. (1988). On the Mechanics of Economic Development. *Journal of Monetary Economics*. Vol. (22:1). Pp. 3-42.

Maluccio, J. (2006). Educational and Child Labor: Experimental Evidence from a Nicaraguan Conditional Cash Transfer Program. In P. F. Orazem, G. Sedlacek, & P. Z. Tzannatos (Eds.), *Child labor and Education in Latin America, InterAmerican Developement Bank*. Washington DC.

Maluccio, J. A., & Flores, R. (2005). *Impact evaluation of a conditional cash transfer program*. The Nicaraguan.

Manley, J., & and V. Slavchevska, S. G. (2012). *How effective are cash transfer programmes at improving nutritional status? A rapid evidence assessment of programmes' effects on anthropometric outcomes*. (EPPI-Centre). Social Science Research Unit, Institute of Education, University of London.

McEwan, P. J. (2015). Improving Learning in Primary Schools of Developing Countries: A Meta-Analysis of Randomized Experiments. *Review of Educational Research.*Vol. 85(3), 353–394.

Neto, NMS. (2010). Impacto do Programa Bolsa Famfilia sobre a Frequ^encia _A Escola: Estimativas a partir de informacoes da PNAD. IPEA.

Ninno, D.C., Dorosh, P.A.,(2002). In-Kind Transfers and Household Food Consumption: Implications for Targeted Food Programs In Bangladesh. IFPRI Discussion Paper, No 134.

Ponce, J. and Bedi, A. (2010). The impact of a cash transfer program on cognitive achievement: The Bono de Desarrollo Humano of Ecuador. *Economics of Education Review*, Vol. (29:1). pp. 116-125

Rocha, S. (2008). Transfer^encias de renda federais: Focaliza_c~ao e impactos sobre pobreza e desigualdade. *Revista de Economia Contempor^anea*, Vol. (12:1) pp. 67-96.

Rosenbaum, P. R., and Rubin, D. B. (1985). Constructing a Control Group Using Multivariate Matched Sampling Methods That Incorporate the Propensity Score. *The American Statistician* Vol. (39:1) pp.33–8.

Romer, P. M. (1986). Increasing Returns and Long-run Growth. *Journal of Political Economy*. Vol. (94:5). Pp. 1002–1037

Rubalcava, L., Teruel, G. and Thomas, D. (2009). Investments, Time Preferences, and Public Transfers Paid to Women. *Economic Development and Cultural Change*, Vol. (57). pp. 507-538.

Sayeed, Y. (2016). Effect of girls' secondary school stipend on completed schooling, age at marriage, and age at first birth. WIDER Working Paper Series 110, World Institute for Development Economic Research

Sergei, S., Osrio, R.G., Soares, F.V., Medeiros, M., and Zepeda, E. (2007). Conditional cash transfers in Brazil, Chile and Mexico: Impacts upon inequality. Working Papers 35, International Policy Centre for Inclusive Growth.

Schultz, T. W. (1961). Investment in Human Capital. *American Economic Review*. Vol. (51). pp, 1-17.

Schultz, TP. (2004b). School Subsidies for the Poor: Evaluating the Mexican Progresa Poverty Program. *Journal of development Economics*, Vol. (74:1). pp. 199-250.

Soares, S. (2012). Bolsa Famfilia: A summary of its impacts. Technical report, International Policy Centre for Inclusive Growth.

Soares, V., Serguei, S., Osório, Guerreiro, R., Medeiros, M., Marcelo, Eduardo, Z. (2007). Conditional Cash Transfers in Brazil, Chile and Mexico: impacts upon inequality. International Poverty Centre Working Paper No.35, UNDP, Brasilia

Skoufias, E. (2005). PROGRESA and Its Impacts on the Welfare of Rural Households in Mexico, Research Report 139, Washington: International Food Policy Research Institute.

Skoufias, E. & Di Maro, V. (2008). Conditional Cash Transfers, Adult Work Incentives, and Poverty. *Journal of Development Studies*, Vol. (44). pp. 935 - 960.

Schurmann, AT. (2009). Review of the Bangladesh Female Secondary School Stipend Project Using a Social Exclusion Framework. *Journal of Health Population, & Nutrition*. International Centre for Diarrhoeal Disease Reserch, Bangladesh, Vol. (27: 4). pp. 505-517.

Todd, J E. and Winters, P. (2011). The Effect of Early Intervention in Health and Nutrition on On-Time Enrollment: Evidence from the Oportunidades Program in Rural Mexico. *Economic Development and Cultural Change*. Vol. (59:3) pp. 549–81.

Ullah, A., (2013). An Analysis of the Impact of Educational Conditional Cash Transfer (CCT) Programs in Bangladesh**.** PhD thesis. University of Canberra.

Vinokur, A., et al. (2000). Two Years after a Job Loss: Long-term Impact of the JOBS Program on Reemployment and Mental Health. *Journal of Occupational Health Psychology*. Vol. (5). pp. 32-47.

Yoong, J., Rabinovich, L. and Diepeveen, S. (2012). The impact of economic resource transfers to women versus men: a systematic review. Technical Report. London: EPPI-Centre, Social Science Research Unit, Institute of Education, University of London.

Appendix

Table A1: Variable Description

Variable List	Description
Outcome variable Share of Educational expenditure out of total annual expenditure Share of food consumption expenditure out of total monthly expenditure Per capita Calorie intake per day	
Explanatory variables Stipend	=1, if the student receives the stipend; 0, otherwise.
Control Variables	
Student's age	In years
Sex	=1, if male
Religion	=1, if Islam
Unmarried	=1, if unmarried; 0, otherwise
Earner	=1, if earner; 0 otherwise
Class/Grade	Which grade the child is in
Parent's characteristics	
Mother's age	years
Mother's education	In years
Mother earner	=1, if yes; 0, otherwise
Head's age	In years
Head's education	In years
Household characteristics	
Number of rooms	Number of rooms in the house
Dependent	Number of nonearning persons in the family
Household size	Total household members
Separate dining room	=1, if Yes; 0, otherwise
Separate Kitchen	=1, if Yes; 0, otherwise
Access to electricity	=1, if Yes; 0, otherwise
Access to improved toilet	=1, if Yes; 0, otherwise
Access to safe water	=1, if household has access to safe drinking water; 0, otherwise.
Roof Material	= 1 if the roof of the main room is constructed of Brick/cement/C.I. sheet/ Tile/wood; and 0, otherwise
Wall material	=1, if the main room is constructed of Brick/cement/C.I. sheet/ Tile/wood; and 0, otherwise
Land holding	In decimals

Variable List	Description
Rural	=1 if rural; 0 if urban
Upper poverty line	
Lower poverty line	
Per capita food consumption expenditure	Monthly per capita food consumption expenditure
Dummies	
Food consumption quintiles, regional dummies (7), Stratum dummies (16)	

Table A2: Distribution of Control (Stipend Recipient) and Treatment (Non-recipient) Group in Terms of Residence, Food Consumption Quintile and Grade

	Treatment Group	Percentage	Control Group	Percentage
Location				
Rural	167	69.29%	2,761	57.62%
Urban	74	30.71%	2,031	42.38%
Total	**241**		**4792**	
Food Consumption Quintile				
Q1	69	28.63%	938	19.57%
Q2	63	26.14%	945	19.72%
Q3	48	19.92%	958	19.99%
Q4	27	11.2%	979	20.43%
Q5	34	14.11%	972	20.28%
Total	**241**		**4792**	
Grade/Class				
Class 6	12	4.98%	791	16.51%
Class 7	65	26.97%	643	13.42%
Class 8	45	18.67%	617	12.88%
Class 9	34	14.11%	535	11.16%
Class 10	49	20.33%	728	15.19%
Class 11	32	13.28%	799	16.67%
Class 12	4	1.66%	679	14.17%
Total	**241**		**4792**	

Source: Own construction using HIES 2010 data.

Table A3: Amount of Stipend

Class/ Grade	Amount of stipend (annual)	Total expenditure on education (annual)	Amount of stipend as a % of educational expenditure
Class 6	850	5297.447	16.05%
Class 7	687.1429	6199.859	11.08%
Class 8	918.8372	7800.689	11.78%
Class 9	839.7059	8548.195	9.82%
Class 10	1017.633	10723.87	9.49%
Class 11	1157.188	15290.22	7.57%
Class 12	687.5	18321.16	3.75%
Overall	891.1139	10409.27	8.56%

Source: Own construction using HIES 2010 data

Table A4 Mean Difference in Treatment and Control Group in Terms of Different Socio-economic Variables

Variable	Treatment group	Control group	difference
Share of Educational expenditure	0.0401109	0.0440083	-0 .0038974
Share of Food Consumption expenditure	0.5680606	0.5349781	0.0330826***
Calorie intake per day per capita	2363.183	2408.406	-45.22308
Socio economic indicators			
Number of dependents	4.240664	4.18197	0.058694
Number of earning member	1.273859	1.294866	-0 .0210075
Head's education (years)	4.676349	5.491861	-0 .8155129***
Mother's education (years)	3.676349	0.8155129	2.6529503**
Monthly per capita income	2347.14	3022.709	- 675.5692***
Monthly per capita consumption expenditure	2482.062	3053.855	- 571.7927***
Land holding	93.91286	90.76315	3.149716

(*** p<0.01, ** p<0.05, * p<0.1)

Table A5 Average Annual Educational Expenditure (Class and Location-wise Variation)

	Rural			Urban		
Class	Treatment Group	Control Group	Difference	Treatment Group	Control Group	Difference
6	2784	3754.344	-970.34	3200	8383.693	-5813.6
7	3922.837	4737.358	-814.52	6205.773	9045.116	-2839.3
8	3762.625	5787.548	-2024.9**	9922.692	11317.34	-1394.7
9	4345.826	6786.327	-2440.5**	12741.36	11630.86	1110.51
10	7376.541	8835.646	-1459.1	13747.33	14020.74	-273.4
11	8655.737	12718.33	-4062.6	18984.15	17933.42	1050.7
12	6760	17248.52	-10488.5	6200	19282.97	-13082.9
Overall	5236.832	8078.729	-2841.896***	11216.74	13891.35	-2674.611

(*** p<0.01, ** p<0.05, * p<0.1)

Table A6 Average Annual Educational Expenditure (Quintile-wise Variation)

Quintiles	Treatment Group	Control Group	Difference
Quintile 1	3835.855	6032.506	-2196.65***
Quintile 2	6348.841	7769.458	-1420.6
Quintile 3	7465.063	9941.023	-2475.96
Quintile 4	10510.96	11544.75	-1033.79
Quintile 5	11700.59	17173.12	-5472.53
Overall	7072.988	10542.3	-3469.3***

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

Table A7 Difference in Annual Educational Expenditure in Treatment & Control Group

Annual Educational expenses	Treatment Group	Control Group	Difference
Admission fee	173.9917	627.602	- 453.6103***
Session fee	127.278	216.0515	- 88.77354***
Registration fee	54.40664	167.6555	- 113.2488
Exam fee	416.3195	457.677	- 41.35746
Tuition fee	97.78838	899.3934	- 801.605**
Book fee	893.834	1004.286	- 110.4517*
Stationary	751.8008	773.4234	- 21.62258
Uniform	554.5228	638.2197	- 83.69692
Tutoring	3034.855	3672.376	- 637.5211
Hostel	5.477178	825.5593	- 820.0821***
Transport	515.4357	621.1519	- 105.7162
Tiffin	372.7344	475.9505	- 103.2161
Internet	0	12.21202	- 12.21202
Donation	0	3.850167	- 3.850167
Other cost	74.54357	146.894	- 72.35042
Total schooling cost	**7072.988**	**10542.3**	**- 3469.314***

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

Table A8 Average Monthly Per Capita Food Consumption Expenditure (Class and Location-wise Variation)

Rural				Urban		
Class	Treatment Group	Control Group	Difference	Treatment Group	Control Group	Difference
6	1169.785	1240.359	-70.57443	1139.065	1424.867	- 285.8021
7	1171.45	1302.206	-1289.571	1538.679	1596.328	- 57.649
8	1040.623	1343.978	-303.355***	1511.552	1693.3	- 181.7484
9	1220.784	1336.287	-115.5029	1113.976	1538.831	-424.8549**
10	1309.992	1408.075	-98.08306	1371.226	1619.095	- 247.8691
11	1805.811	1412.952	392.8587**	1723.565	1739.952	- 16.38661
12	1234.647	1525.328	- 290.6815	979.09	1772.019	- 792.9285
Overall	**1257.079**	**1357.094**	**-1351.39**	**1457.745**	**1644.375**	**-1637.814**

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

Table A9: Monthly per Capita Food Consumption Expenditure (Quintile-wise Variation)

	Treatment Group	Control Group	Difference
Quintile1	768.4222	794.0436	-25.62*
Quintile2	1075.1 86	1082.73	-7.54
Quintile3	1328.263	1326.755	1.507
Quintile4	1602.934	1643.824	-40.89*
Quintile5	2647.402	2508.575	138.83
Overall	1318.694	1478.853	-160.16

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

Table A10 Calorie Intake Per Capita Per Day (Class and Location-wise Variation)

Rural				Urban		
Class	Treatment Group	Control Group	Difference	Treatment Group	Control Group	Difference
6	2408.074	2350.442	57.63	2202.25	2227.693	- 25.44
7	2425	2367.008	57.99	2204.817	2330.686	- 125.87
8	2232.193	2455.114	- 222.92**	2285.489	2304.466	- 18.98
9	2385.358	2445.218	59.86	1982.627	2296.232	- 313.60**
10	2540.611	2503.893	36.719	2205.89	2340.794	- 134.90
11	2490.72	2548.39	- 57.67	2497.841	2384.85	112.99
12	2662.39	2635.812	26.58	2191.18	2399.888	- 208.71
Overall	2418.938	2461.91	- 42.972	2237.358	2335.672	- 98.314*

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

Table A11: Calorie Intake Per Capita Per Day (Quintile-wise Variation)

	Participants	Non-Participants	Difference
Quintile1	1963.442	1982.757	- 19.31494
Quintile2	2337.161	2290.908	46.25346
Quintile3	2508.697	2407.148	101.5489
Quintile4	2531.343	2541.978	- 10.63532
Quintile5	2883.669	2800.107	83.56178
Overall	**2363.183**	**2408.406**	**- 45.22308**

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

Table A12 PSM Scores Using Alternative Matching Technique (Robustness Checking)

Alternative methods		Share of educational expenditure (1)	Share of food consumption Expenditure (2)	Calorie intake per capita per day (2)
Nearest Neighbour Matching	Number of treatments	241	241	241
	Number of controls	224	224	224
	ATT	0.001	0.009	44.924
	t-stat	0.401	0.774	0.882
Stratification Matching	Number of treatments	241	241	241
	Number of controls	4160	4160	4160
	ATT	-0.001	0.001	12.197
	t-stat	-0.326	0.112	-0.325
Radius Matching	Number of treatments	241	241	241
	Number of controls	4689	4689	4689
	ATT	-0.004	0.029	32.972
	t-stat	-1.752	3.490	-0.892
Kernel Matching	Number of treatments	241	241	241
	Number of controls	4792	4792	4792
	ATT	-0.003	0.019	27.005

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

Table A13 Statistical Test for Checking the Quality of Matching

| Variable | Mean | | %bias | t-test | V(T)/ |
	Treated Control			t p>t	V(C)
age	14.17 13.963		4.6	1.22 0.223	1
Square of age	204.26 198.42		6.3	1.18 0.237	1.04
religion	1.1411 1.112		3.9	0.96 0.339	1.22
unmarried	.98755 .9917		-3	-0.45 0.654	.
worked	2 2		.	. .	.
class	8.6432 8.5104		4.3	0.88 0.381	0.82
reg_dum1	.17012 .19917		-5.7	-0.82 0.412	.
reg_dum2	.08299 .07884		1.2	0.17 0.868	.
reg_dum3	.26141 .24066		4.7	0.52 0.600	.
reg_dum4	.22822 .19087		9.6	1.01 0.315	.
reg_dum5	.0166 .0249		-3.2	-0.64 0.524	.
reg_dum6	.22822 .24896		-5.8	-0.53 0.594	.
No. of rooms	2.6349 2.5311		3.9	0.97 0.334	0.92
Separate dining	1.834 1.834		0	0.00 1.000	1
Separate kitchen	1.0996 1.0871		3.8	0.47 0.639	1.13
Wall material	.72199 .75934		-4.6	-0.93 0.351	.
Roof material	.96266 .9751		-3.3	-0.79 0.432	.
Access to improved latrine	.639 .6473		-1.7	-0.19 0.850	.
Access to safe water	.9751 .9751		0	-0.00 1.000	.
Access to electricity	.54772 .56846		-4.4	-0.46 0.647	.
Land holding	93.913 89.56		2.8	0.36 0.718	1.47*
Hh size	5.5145 5.7095		-5.9	-1.08 0.281	0.95
No. of dependent	4.2407 4.3527		-4.4	-0.70 0.482	1.04
head_age	48.378 47.664		3.2	0.84 0.404	1.18
head_edu	4.6763 5.1452		-4.9	-1.10 0.272	1.08
mother_age	40.448 40.336		1.3	0.16 0.875	1.02
mother_earner	1.9212 1.9129		3.1	0.33 0.742	0.91
mother_edu	3.6763 3.7386		-1.5	-0.17 0.863	1.05
Rural	1.3071 1.3112		-0.9	-0.10 0.922	0.99
Upper pov	1569.5 1565.2		2.6	0.32 0.747	1
Lower pov	1279.7 1282.1		-3.2	-0.40 0.691	0.99
Per capita food cons.	1318.7 1249.1		4.2	1.12 0.262	2.49*

* if variance ratio outside [0.78; 1.29]

Ps R2	LR chi2	p>chi2	MeanBias	MedBias	B	R	%Var
0.028	18.55	0.962	4.1	3.9	39.5*	1.26	15

* if B>25%, R outside [0.5; 2]

Table A14 OLS Regression for Robustness Checking

VARIABLES	Log of annual Educational expenditure (2)	Log of per capita food consumption (1)	Log of calorie intake Per capita per day (3)
Stipend	0.0748	0.0127	0.0204*
(=1, if receives stipend)	(0.0480)	(0.0149)	(0.0120)
Sex of the recipient	-0.163***	-0.00529	-0.0205***
(=1 if female)	(0.0205)	(0.00638)	(0.00515)
Age of the recipient (in years)	-0.0249***	-0.000629	0.00355***
	(0.00503)	(0.00156)	(0.00126)
Religion of the recipient	0.0549**	-0.0113	0.0214***
(=1, if Islam)	(0.0260)	(0.00809)	(0.00653)
Unmarried	0.214***	-0.0374*	-0.00806
(=1 if unmarried)	(0.0626)	(0.0193)	(0.0156)
Class or Grade	0.182***	-0.0104***	-0.00282
	(0.00832)	(0.00258)	(0.00208)
Mother's age (in years)	-0.00162	-0.000419	-0.000440
	(0.00124)	(0.000384)	(0.000310)
Mother's earning	-0.0924**	0.0489***	0.0361***
(=1, if earner)	(0.0382)	(0.0119)	(0.00960)
Mother's Education (in years)	0.00866**	-0.00635***	-0.00761***
	(0.00388)	(0.00121)	(0.000974)
Head's Education (in years)	0.00766**	-0.00282***	-0.00159*
	(0.00325)	(0.00101)	(0.000814)
Rural (=1, if rural)	0.0956	-0.0608**	0.0129
	(0.0761)	(0.0236)	(0.0191)
Log of pc income (monthly)	0.00324	-0.00642	-0.0142***
	(0.0169)	(0.00523)	(0.00422)
Log of pc consumption (monthly)	0.770***	0.711***	0.279***
	(0.0296)	(0.00919)	(0.00743)
Land holding (in decimal)	-2.43e-06	9.18e-05***	0.000189***
	(6.43e-05)	(2.00e-05)	(1.61e-05)
Lower Poverty line	0.000782**	9.41e-05	-0.000312***
	(0.000337)	(0.000105)	(8.47e-05)
No. of dependents in the household	0.0379***	-0.0102***	-0.0141***
	(0.00659)	(0.00205)	(0.00165)
Access to electricity	0.0208	-0.00155	-0.0287***
	(0.0256)	(0.00793)	(0.00641)
Access to improved Toile	0.0775***	-0.0161**	-0.0430***
	(0.0248)	(0.00770)	(0.00622)
Wall material of the main room	-0.00380	-0.0112	-0.0264***
	(0.0263)	(0.00816)	(0.00659)
Separate kitchen	-0.00639	-0.0140	0.0102
	(0.0285)	(0.00886)	(0.00716)
Separate dining room	0.0595**	0.0275***	0.0157**
	(0.0263)	(0.00816)	(0.00660)
Stratum dummies	Yes	Yes	Yes
Constant	-0.199	1.812***	6.088***
	(0.445)	(0.138)	(0.112)
Observations	5,014	5,030	5,030
R-squared	0.472	0.723	0.377