

## **Efficient Allocation of Money for Education Attainment: A Theoretical Perspective**

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*Education is one of the prime factors of growth. Developing countries actively seek policy measures to bring their children to schools and reduce dropout. In that effort, Conditional Cash Transfers (CCT) as well as motivational campaigns are common strategies applied to attract enrollment and retention. However CCT has been found to have limited effects. Also low retention rate is a problem for CCT programs. This current study tries to find a theoretical explanation of this problem. This study has demonstrated that conditional stipends will be effective only if it is sufficient to keep the household at its original level of utility. This gives a rational economic explanation of dropout of students forgoing CCT program. However as the marginal cost of stipend increases with rising educational requirements, governments should focus more on using advertisement to persuade households to invest in education for their children.*

**Keywords:** Education, Conditional Cash Transfer (CCT), Dropouts

### **1. Introduction**

Although education is one of the prime movers of growth and development, it is neither short nor cheap. Unlike most goods, attainment of quality education is lengthy and frequently results in significant opportunity loss in income. This makes education disproportionately costly. Nevertheless, good quality, useful education is imperative for growth.

In developing countries parents are frequently incapable and/or uninterested to bear full cost of education for their children. People suffering from extreme poverty can lose foresightedness and can myopically focus on short term benefit. However, governments strive to encourage investment in schooling because in advanced, complicated, mechanized production processes, productive labor is synonymous to educated labor. Even good quality primary level education can equip children with basic problem solving skills that can increase their chances of moving out of poverty compared to uneducated children. Therefore governments of low income countries take different measures to attract pupils from low income households to attend schools. In that vein, education subsidy is an expected policy measure in those countries. Sometimes that needs to be supplemented by cash transfer and augmented by positive advertisement launched by the governments to motivate people in favor of attaining education.

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Since education is not a marketable commodity like papaya or resins, direct financial incentives for students may not work as expected. Returns of education are high and oftentimes significant, but unfortunately the returns are realized after a lag period. Recent studies suggest that freshman year performance may be critical for high school success (Allensworth & Easton, 2005; Neild, Stoner-Eby & Frustenberg, 2008). However, wage increase associated with earning a diploma accrue years in the future and may lack salience for students at the beginning of high school.

Since recipient households frequently operate at a very financially tight condition it is not unlikely that unconditional stipend will motivate them. However if stipend comes with a condition then their participation in the program is not guaranteed. Implicitly, the authors of this paper argue for a stipend threshold below which a household may decide not to participate, forgoing the amount (since that will be economically less rewarding for them). Non participation or withdrawal from the program after participating for a while is not an uncommon behavior. In this paper the authors rationalize this phenomenon and theoretically try to find a threshold of Conditional Cash Transfer (CCT).

Since governments deal with limited budgets it is important for them to allocate money efficiently among cash (or kind) incentive and advertisement. Since effectiveness of both methods is beyond question using both methods will be smarter than using either one of them. This proposed paper will generate important insights about how budget should be allocated efficiently between cash expenditure and advertisement in order to get maximum outcome in attaining education. The theoretical predictions of this paper will be tested against Bangladeshi data.

Although governments spend a significant sum on transfer payment programs, the results are in most cases discouraging. Most existing papers on CCT are empirical in nature, and mostly evaluate the effectiveness of increasing participation and reducing dropout (Ahmed, 2005; Ahmed et al, 2009; Baulch, 2011; Sivakul, 2012). In general, these papers show that despite large investments made in CCT programs by governments, enrollment remains low and dropout remains high. This study provides an important policy insight for the cause behind low participation and retention of eligible students in these programs. Through the use of a basic utility maximization model, this study demonstrates how households will be willing to invest more in education if they are adequately compensated for their immediate loss in utility. The theoretical model has also been tested on empirical data from rural Bangladesh. Many studies have also measured the cost and targeting inefficiencies of CCT programs (Ahmed & Sharmeen, 2004; Ahmed, 2005; Baulch 2011; Ullah & Perumal, 2012). This paper shows it is cost effective if advertising is used in combination with CCTs when marginal cost of transfer payments begin to rise with increasing educational requirement. Investing behind CCTs and advertising in optimal combination is not only more sustainable, but can lead to significant cost reductions through effects carried forward in future generations.

Rest of the paper is organized as follows. The next section briefly discusses the major conditional cash transfer programs of Bangladesh. Section 3 discusses relevant literature which is followed by specifications of the theoretical model in Section 4. Results of the simulation and discussions are also in Section 4. Usual concluding remarks are presented in Section 5.

## **2. Major Conditional Cash Transfer (CCT) programs of Bangladesh**

The Government of Bangladesh largely maintains two education stipend programs - Primary Education Stipend (PES) and Female Secondary School Stipend (FSSS). PES program replaced its predecessor Food for Education (FFE) program in July 2002. FFE program was an in-kind transfer program that distributed 15 kg of wheat or 12 kg of rice per month to eligible households in certain poverty-stricken regions in Bangladesh conditional on sending children to school. PES program on the other hand is a conditional cash transfer program that disburses BDT 100 per month for one child and BDT 125 for two children to eligible households all over rural Bangladesh. The eligibility criteria for selection are based on household land ownership status, occupation of breadwinner, female-headship and main income source.

According to Ministry of Primary and Mass Education, PES was given to 5.5 million children from 2002-03 to 2006-07. Cost of the program during this period amounted to USD 45 million (Ahmed & Khondkar, 2010). However, the stipend amount was never adjusted for inflation. According to Baulch (2011), PES transfer which could purchase around 11 kg of wheat and 7.5 kg of rice in 2003 could only purchase 6.1 kg of wheat or 6.2 kg of rice in 2006, and by 2008 the purchasing amount declined to less than 4 kg of wheat or rice.

The other major stipend program in Bangladesh is Female Secondary School Stipend Program (FSSSP). This program does not specifically target students from poor households. Instead, FSSSP is only meant for female students and selection is based on the fulfillment of the three following requirements: student maintains at least 75% attendance at school; scores a minimum of 45% in annual examinations; remains unmarried till the completion of SSC exams (Ahmed & Sharmeen, 2004). FSSSP is a two-part subsidy – it covers the full-tuition fee for each school year and disburses an additional subsidy that gradually increases with grade (Khondkar et al, 2003). The main objective of FSSSP is to increase enrollment of female students at secondary level, and to delay marriage and childbearing among young girls.

Ahmed & Sharmeen (2004) calculates that the annual explicit (direct and indirect) cost of attending primary level school is BDT 958 according to 2004 estimations. PESP provides an annual amount of BDT 1200 for one enrolled student. On the other hand, the FSSSP is barely sufficient to even cover the direct costs of schooling. The direct costs add up to BDT 252 per year, while the stipend amount is BDT 300. The indirect costs are about BDT 2,369 per year that is not covered by the stipend (the largest source of indirect costs is private tutoring fees). The highest amount of secondary school stipend offered is BDT 720 per year, which is only sufficient to cover one-third of the total explicit expenditure of sending a female child to school in the lowest income group (Ahmed & Sharmeen, 2004).

## **3. Literature Review**

Conditional transfer program has been implemented in many parts of the world. In its typical form a household receives incentives in cash or kinds when they send their kids to school. Disbursement of stipend is normally made conditional on continuation and minimum attendance in school. Although there are only few theoretical studies on this

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issue there is no shortage of case studies and post program analysis of different CCTs (Schultz, 2004; Angrist & Lavy, 2009; Bettinger, 2012; Rodriguez-Planas, 2012).

There are only a handful of theoretical papers that have proposed CCT program designs that are efficient and effective in securing participation of households. Gahvari & Mattos (2007) developed a theoretical model based on Besley & Coate (1991) to show that inefficiency arising from providing free education can be reduced if combined with conditional transfers. Their model shows that education can be distributed for free at a certain level of quality, such that it is acceptable to the poor, but the rich would rather buy a higher quality from the market. However, there is a welfare loss associated with such practice, as the provided quality is different from the recipient's desired quality. Gahvari & Mattos (2007) showed that this deadweight loss can be avoided if level of quality is bundled with a cash transfer.

Martinelli & Parker (2008) and Fiszbein & Schady (2009) argued that a stipend for education can effectively lower the price of education and can increase its consumption by a substitution effect. Fiszbein and Schady (2009) added that while an unconditional cash transfer (UCT) would increase consumption of education only to a certain extent due to an income effect, a CCT is more effective as it also induces a substitution effect. De Janvry & Sadoulet (2006) also mentioned in their paper that the use of CCTs are justified when the income effects of a UCT cannot sufficiently boost demand to make any significant impact on the desired outcome. There is also some empirical evidence in support of the CCT substitution effect.

According to Das et al (2005), there are two main purposes of conditional transfer programs – one is to increase efficiency when externalities exist and the other is to reduce inequality and promote equitable access to resources by targeting low-income households. Currie & Gahvari (2007), Fiszbein & Schady (2009), and Sivakul (2012) also highlight on the paternalistic use of CCT programs to improve private and social welfare. Many poor households tend to be myopic and invest less in education. In extension to this problem, households may not always have correct information to guide their actions. From the perspective of social welfare, household's private optimal level of education may be less than the social optimal level of education therefore opening a potential scope for generating positive externalities.

Similarly to Gahvari & Mattos (2007), this study also proposes the use of CCTs to encourage households to send their children to schools. While Gahvari & Mattos (2007) demonstrated the use of CCTs to overcome welfare loss from inferior quality of education, this paper proposes the use of CCTs to overcome short-term welfare loss associated with loss of utility. As pointed out by the authors Das et al (2005), Currie & Gahvari (2007), Martinelli & Parker (2008), Fiszbein & Schady (2009), and Sivakul (2012), an unconditional transfer would not guarantee that the money is indeed compensating for their short-term loss in utility from investment in more education due to the myopic outlook of most low-income households. Thus adding a condition to the transfer is integral.

Most of the empirical research on Bangladesh's education stipend program is concerning the effectiveness of cash and in-kind transfers on increasing enrollment and improving nutrition status of recipient children. Ahmed (2005) and Ahmed et al (2009) finds that cash and in-kind transfers perform at par in increasing enrollment, however

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cash transfers do not lead to statistically significant increases in household's consumption of food, while in-kind transfers of food do. On the other hand, Baulch (2011) finds the PES program has negligible effects on grade progression and does not have statistically significant positive effects on school enrollments, basic expenditure, and calorie and protein consumption. Furthermore the author notes that the overall impact of the PES is considerably insignificant compared to the magnitude of the program. Khondkar et al (2003) using two sets of cross-sectional data, and found that the female secondary school stipend program has significant positive impact on female enrollment into secondary schools. Schurmann (2009) indicates that the FSSSP has been effective in increasing enrollment of young women in schools. However, the author notes that it is still unclear how effective the program has been in delaying marriage and childbearing, and increasing empowerment and employment opportunities among young female adults.

A number of empirical studies also focus on the targeting and expenditure inefficiencies of transfer programs. Ahmed & Sharmeen (2004) finds that around 15.2% of all PESP recipients do not meet even one of the five means-test selection criteria. The same study shows that around 60% of non-beneficiary households, whose children attended PESP host schools, owned less than half an acre of land and yet did not receive any stipends. Ahmed (2005) estimates that the targeting error for exclusion (not selecting truly needy and deprived households into the program), for the PES program was 45.6% of all households with primary school-aged children. On the other hand, the targeting error for inclusion (selecting non-poor households into the program) was 39.8%. Baulch (2011) also finds that overtime the error of inclusion is rising as well, with the proportion increasing from 17.1% of all recipient households in 2003 to 27.4% by 2006. Ullah & Perumal (2012) also find that less than 60% of the recipients came from low-income households. Although PESP targets to cover 40% of all eligible students, the authors find that in reality this was only 23%.

In summary, the empirical papers broadly highlight on the effectiveness of CCT programs on increasing children's enrollment in schools. Many papers have also questioned the cost efficiency of using CCTs to attain greater welfare, as in many cases the transfer amount is trivial to make a significant difference. The theoretical model of this paper provides a possible explanation behind the ineffectiveness of many CCT programs in attracting participation and retention and also demonstrates how to derive the correct amount of transfer necessary to ensure an effective outcome.

Another alternative strategy that has been practiced to encourage schooling is persuasion in favor of education using mass media. Effective advertising causes the household's tastes and preferences to change which alters the slope of the household's indifference curve (Besanko & Braeutigam, 2005; Salvatore, 2008). More specifically, if investment in education is on the x-axis, the indifference curve would become steeper if households respond positively to these promotion campaigns by realizing the true benefits of education. This means MRS increases, which is indicative of increasing  $MU_x$ , and therefore requires the household to adjust its equilibrium

Fiszbein & Schady (2009) explain how households' private information about returns of education may be very different from the actual returns of education. This information asymmetry can be easily overcome by creating awareness and spreading information, all of which would help to increase household's preferences towards education. A study

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by Attanasio & Kaufmann (2009) compared the expected returns to education with observed Mincerian returns using a household survey in Mexico. They found that the expected marginal returns were lower than the realized marginal returns, especially among children with poorly educated fathers. A similar type of study was conducted among eighth-grade students in Dominican Republic, and the results showed that the students estimated the returns to be one-fourth or one-third of the actual returns derived from an income survey. When the students were later told about this vast discrepancy, those who initially underestimated the returns increased their secondary school graduation by 6% (Fiszbein & Schady, 2009). Datta & Mullainathan (2014) in their paper also discuss a case where many parents in Madagascar and Morocco underestimated the marginal returns of an extra year of education in lower grades. When the correct information was publicized among parents, the test scores of the children increased particularly among those children whose parents had initially underestimated the marginal returns of education.

Furthermore, there is overwhelming amount of literature that show that gender disparity in educational attainment is often times a result of cultural barriers against women, general unawareness and stigma. Hence, stipends are not fully effective to counter these prejudices. Several papers have discussed the negative effects of patriarchal norms on the education attainment of girls in Bangladesh (Mahmud, 2003; Adato & Hoddinott, 2007; Sarkar et al, 2014). These authors among many others have suggested the use of strong advocacy campaigns to mobilize awareness.

With increasing educational attainment, the authors of this paper expect that marginal cost of CCT will begin to increase. Based on the plethora of case studies that testify to the effectiveness of awareness campaigns and information dissemination, this study introduces the notion of using advertising to complement CCTs and balance out rising costs of transfers with increasing educational requirements. The use of advertisement and CCTs in combination is a strategy that has been only hinted at by few papers (Khondkar et al, 2003; Fiszbein & Schady, 2009; Schurmann, 2009).

In this paper, the authors show that participation in programs depends on compensation for loss of utility caused by the condition of the cash transfer. The paper further demonstrates empirically that households will drop out of the program when CCT becomes insufficient to compensate for any potential loss in utility. Hence to attain greater efficiency in cost management, the transfer must meet a certain threshold below which household participation is unlikely. The paper also shows that when costs of CCT begin to escalate, advertisement can be regarded as an alternative strategy to apply as has been proved to be effective in several case studies mentioned.

### **4. Methodology and Derivations**

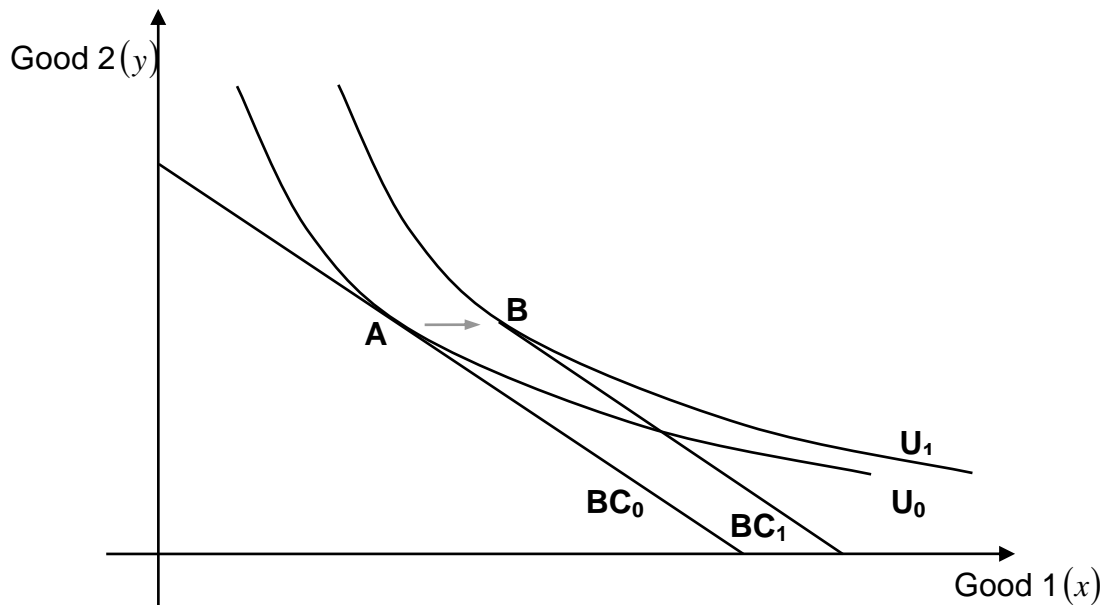
The theoretical model begins with a simple household setup which has a child of school going age and the household is not affluent enough to send the child to school. This also includes households that send their kids to school but in the event of an adverse situation the children may be forced to leave school and engage in income generating activities. Cash handout will help the household to keep its child in school. However the household is generally poor so that if cash handout comes without condition then that is less likely to go for child's education. Even when the cash flow is conditional there is a

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possibility that in absence of proper monitoring the cash can be used for income generating or consumption purpose, abandoning the original motif of cash handout.

In the standard setup, there are two goods to consume, education( $x$ ) and all other goods( $y$ ). Household has a standard budget constraint and indifference curve that touches each other to make the optimum consumption bundle.

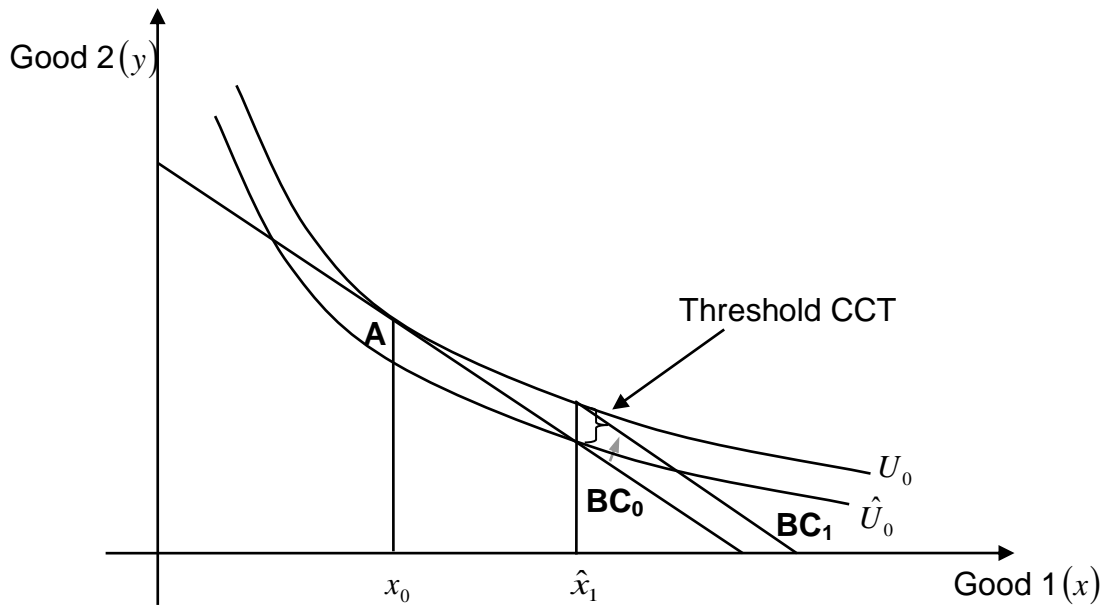
**Figure 1: Effect of Conditional cash stipend on education (most efficient case)**



While the initial equilibrium is at point A, after cash handout conditional upon attainment of education, consumption of good 1 (education) increases but consumption of good 2 remains the same. So the household moves to point B and consumes higher level of education. This outcome will be referred as the most efficient case.

For a typical poor household, the authors expect that it will participate in CCT provided that doing so does not reduce their welfare/utility. In that case they would like to be on the same indifference curve as they were before entering into the program.

Figure 2: Threshold CCT



When there is no stipend program the household consumes  $x_0$  amount of education however due to conditional stipend now it has to consume  $\hat{x}_1$  amount of education thus they will have to adjust to lower level of indifference curve  $\hat{U}_0$ . But that will certainly push them away from education. Therefore the amount of CCT has to be sufficient enough so that they can move back to  $U_0$ . The authors call this difference the CCT threshold below which a household will not participate in the program.

However, it may well be possible that the monitoring is not efficient and the handout given is only partially used for education. In that case, situation will be something like below:



Figure 3: Effect of Conditional cash stipend on education (less efficient case)

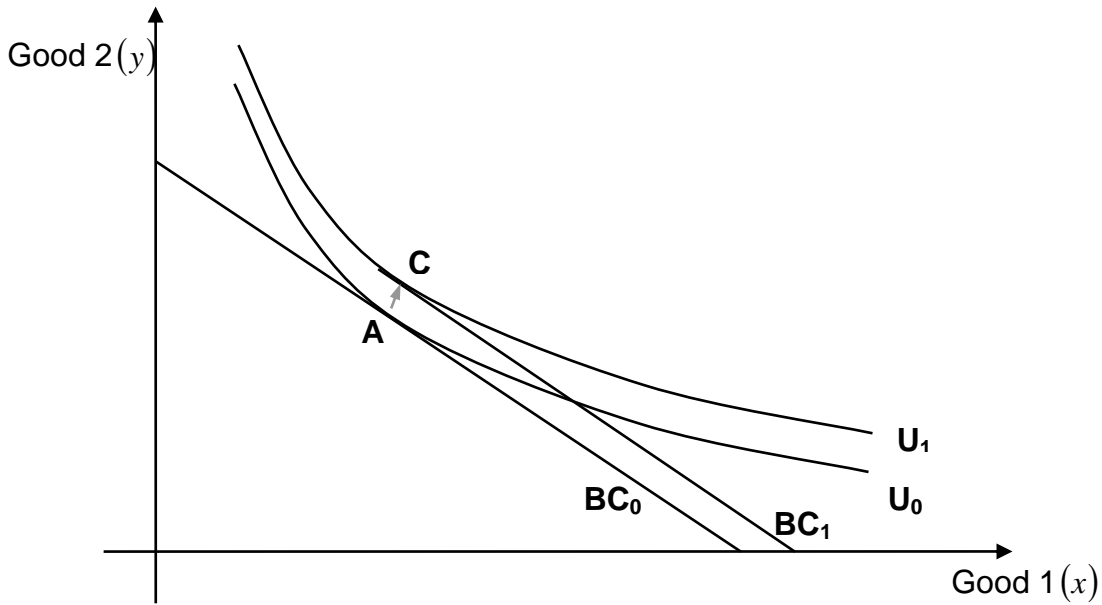
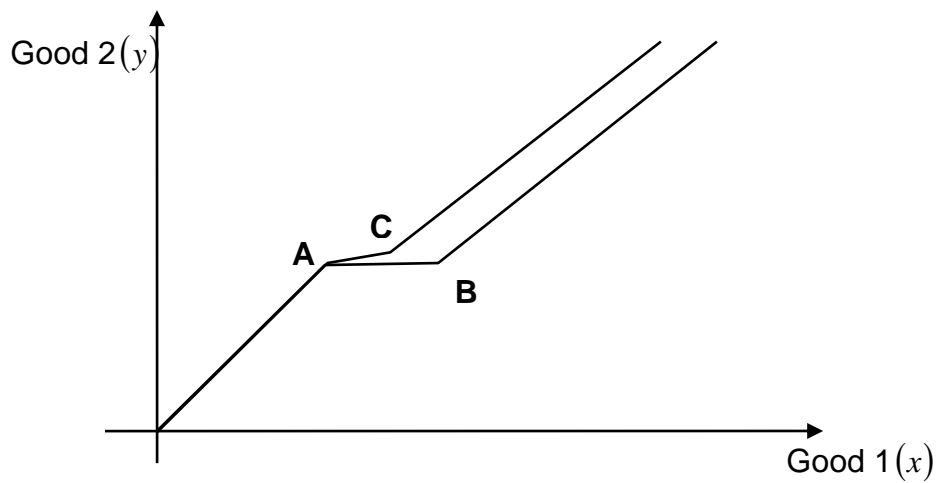


Figure 4: Expansion paths



The paper analyzes this situation using a standard optimization setup. Suppose a standard household has a Cobb-Douglas utility function over two goods, education ( $x_1$ ) and non-education ( $x_2$ ). All other goods are lumped into “non-education” category for convenience. Their budget constraint is linear and its optimization problem looks like:

$$\max_{x_1, x_2} C_0 = p_1 x_1 + p_2 x_2 \quad \text{subject to } \bar{U} = A x_1^\alpha x_2^\beta$$

Solving through the method of Lagrange, the compensated demand functions are

$$x_1 = \left(\frac{\bar{U}}{A}\right)^{\frac{1}{\alpha+\beta}} \left(\frac{\alpha p_2}{\beta p_1}\right)^{\frac{\beta}{\alpha+\beta}}$$

And

$$x_2 = \left(\frac{\bar{U}}{A}\right)^{\frac{1}{\alpha+\beta}} \left(\frac{\beta p_1}{\alpha p_2}\right)^{\frac{\alpha}{\alpha+\beta}}$$

Therefore the cost becomes

$$C_0 = \left(\frac{\bar{U}}{A}\right)^{\frac{1}{\alpha+\beta}} p_1^{\frac{\alpha}{\alpha+\beta}} p_2^{\frac{\beta}{\alpha+\beta}} \left\{ \left(\frac{\alpha}{\beta}\right)^{\frac{\alpha}{\alpha+\beta}} + \left(\frac{\beta}{\alpha}\right)^{\frac{\alpha}{\alpha+\beta}} \right\}$$

However when government imposes an outside condition of achieving certain level of education for children (say level  $\hat{x}_1$ ) and offers conditional cash transfer then this equilibrium is disturbed. The level of education consumption is then exogenously fixed ( $\hat{x}_1$ ) leaving no room for the other variable to achieve optimum level. Rather the household has to operate in a suboptimal equilibrium. Government may implement this in two ways: they can make it mandatory and force people to comply and alternatively they can give incentive to households. In Economics imposing mandatory rules is not a celebrated idea, and therefore it is more sensible for any government to follow the incentive path. In that case the household may like to be compensated as much so that they can be at the original indifference curve. In that case they will welcome this new idea as they do not have to sacrifice any utility. The new idea just reshuffles their consumption bundle. In that consumption of non-education has to be at least:

$$x_2 = \left(\frac{\bar{U}}{A}\right)^{\frac{1}{\beta}} \hat{x}_1^{-\frac{\alpha}{\beta}}$$

Now cost of attaining this changed bundle will be

$$C_1 = p_1 \hat{x}_1 + p_2 \left(\frac{\bar{U}}{A}\right)^{\frac{1}{\beta}} \hat{x}_1^{-\frac{\alpha}{\beta}}$$

This makes the minimum Conditional Cash Transfer (CCT)

$$CCT = C_1 - C_0$$

$$\Rightarrow CCT = p_1 \hat{x}_1 + p_2 \left(\frac{\bar{U}}{A}\right)^{\frac{1}{\beta}} \hat{x}_1^{-\frac{\alpha}{\beta}} - \left(\frac{\bar{U}}{A}\right)^{\frac{1}{\alpha+\beta}} p_1^{\frac{\alpha}{\alpha+\beta}} p_2^{\frac{\beta}{\alpha+\beta}} \left\{ \left(\frac{\alpha}{\beta}\right)^{\frac{\alpha}{\alpha+\beta}} + \left(\frac{\beta}{\alpha}\right)^{\frac{\alpha}{\alpha+\beta}} \right\}$$

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The paper terms this difference the threshold CCT. Interesting to notice that this is not necessarily an increasing function of level of education  $\hat{x}_1$

$$\frac{\partial CCT}{\partial \hat{x}_1} = p_1 - \frac{\alpha}{\beta} p_2 \left( \frac{\bar{U}}{A} \right)^{\frac{1}{\beta}} \hat{x}_1^{-\frac{\alpha}{\beta}-1}$$

The paper now introduces marginal cost of an alternate specification of attaining higher level of education. Society can induce CCT which has a marginal cost function like

$$MC_{CCT} = e^{\gamma(edu)}$$

This basically shows that  $MC_{CCT}$  is an increasing function of education attainment. The authors argue that such function makes sense as education becomes more and more costly (due to costly equipment, hiring of better qualified teachers, lab facilities etc.) with its higher level. Coefficient  $\gamma$  can be considered as the coefficient of adjustment. This

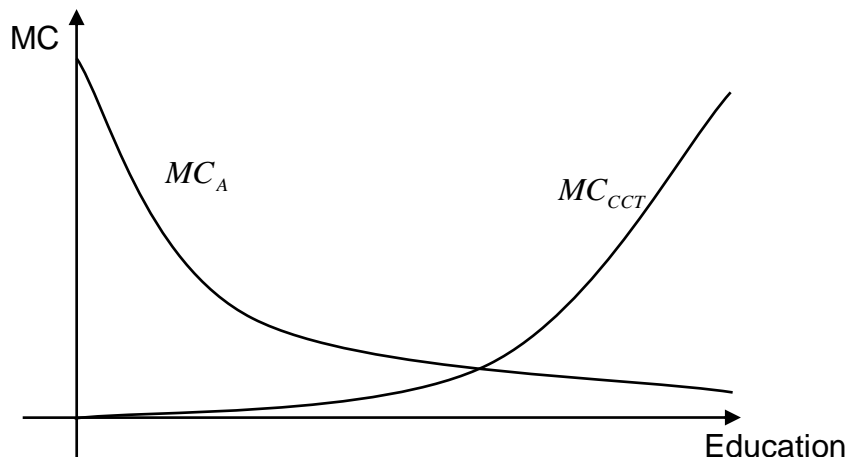
however makes the total cost function exponential as well:  $TC_{CCT} = \frac{1}{\gamma} e^{\gamma(edu)}$

However in case of persuasion based education attainment the authors assume that marginal cost function takes the following form:

$$MC_A = C_A + e^{-\eta(edu)}$$

Here the authors assume that there is an initial status quo barrier for respondents to overcome in order for the advertisement to take effect. Then once they are sufficiently persuaded then extra cost of motivating them for even higher level of education is low. That is the marginal cost diminishes exponentially. Such assumption will make the total cost function exponential as well. Both marginal cost curves are drawn below:

**Figure 5: Marginal cost curves**



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This however opens up the existence of efficient level of expenditure pattern which can be achieved by equation  $MC_{CCT}$  and  $MC_A$ . Mathematically it can be found by solving the following equation:

$$e^{\gamma(edu)} = C_A + e^{-\eta(edu)}$$

$$\Rightarrow e^{\gamma(edu)} - C_A - e^{-\eta(edu)} = 0$$

Solution of this equation is little complicated however sensitivity of equilibrium level of education with each variable are derivable. To be specific:

$$\frac{d(edu)}{d\gamma} = -\frac{edu[e^{\gamma(edu)}]}{\gamma e^{\gamma(edu)} + \eta e^{-\eta(edu)}}$$

This is clearly negative and remains negative for the whole range of level of education. Sensitivity of equilibrium level of education with coefficient  $\eta$  is:

$$\frac{d(edu)}{d\eta} = -\frac{edu[e^{-\eta(edu)}]}{\gamma e^{\gamma(edu)} + \eta e^{-\eta(edu)}}$$

This is again negative for the whole range of level of education. Sensitivity with  $C_A$  is:

$$\frac{d(edu)}{dC_A} = \frac{1}{\gamma e^{\gamma(edu)} + \eta e^{-\eta(edu)}}$$

This is positive throughout the whole range of level of education.

The model's analytical derivations add to the literature with the concept of threshold CCT. It also highlights the issue of balancing effort between cash incentive and advertisement based persuasion. To the best of the authors' knowledge no study has addressed these two issues before.

The data used for this study has been collected from the Bangladesh Integrated Household Survey (2015) published by International Food Policy Research Institute (IFPRI). The data is nationally representative of rural Bangladesh. The data set contains 1117 children who are currently enrolled in schools and receiving Primary Education Stipend (PES) and contains 592 children who were receiving stipends but still dropped out of school before completing their education. Since PES recipients are means-tested, it can be assumed that these households are ultra-poor. Since the researchers of this paper did not collect the data themselves, testing this hypothesis with such dataset is a little tricky. However based on the argument developed in the above section, the authors expect that a stipend receiving household will stop sending its kids to school whenever it finds the stipend is not sufficiently large enough. If such argument is valid then the results should show that as the recipient household becomes more affluent it will discontinue schooling of their children. Such behavior can be also interpreted as an overall unacceptance of education among poor household. However that will most probably not be the case for Bangladesh as high investment in advertisement through mass media has created a positive outlook about education. Also education is made

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free and mandatory. Therefore any dropout can be considered mostly because of financial or economic reason. In that case, the authors expect dropout will increase due to increase of household income, of course controlling other factors.

Since many poor households of Bangladesh are engaged in unreported economy, income may not be a good measure of economic affluence. For that the authors took expenditure as an indicator of economic affluence. To adjust for family size the researchers used per capita family expenditure (PCEXP).

**Table 1: Binary regression results of dropout**

Dependent Variable: DO				
Method: ML - Binary Probit (Quadratic hill climbing)				
Variable	Coefficient	Std. Error	z-Statistic	Prob.
PCEXP	5.24E-06	1.45E-06	3.62	0.000
PEDU	-0.035412	0.009178	-3.86	0.000
GENDER	-0.389007	0.069087	-5.63	0.000
DIST	0.049080	0.035983	13.64	0.000
C	-0.914532	0.081126	-11.27	0.000
McFadden R-squared	0.1190	LR statistic	262.5	
Log likelihood	-971.3810	Prob(LR statistic)	0.000	
Obs with Dep=0	1117	Total obs	1709	
Obs with Dep=1	592			

DO: Dropout variable 1 = dropout, 0 = continuing

GENDER: 1 = male, 0 = female

PEDU: Highest level of parent's education

DIST: Distance from school

The results show that all the explanatory variables have the expected impact. That is as household expenditure (income) grows there is more probability for dropout. This may sound counterintuitive but it has to be kept in mind that these households are ultra-poor and their income has very high marginal utility (compared to normal households). Therefore forgoing even small amount of income can be economically irrational from myopic optimization. Hence, the results support the previously stated hypothesis that as household income status improves the CCT amount becomes less effective in retaining children in schools. Male students have lower probability for dropout. Children of more educated parents have lower probability for dropout. Higher the distance from school higher the probability for dropout. The results are qualitatively robust across different specifications.

The finding has an important policy implication. If the government's goal is to provide basic education to all children then it should make policies that suit them best. If increased level of income induces households to withdraw their children from school then those kids should be retained following a different approach. As the household become more affluent with time, stipend can gradually increase to accommodate their expectations. Combining with other findings, the authors stress on the potential role of advertising. People can be motivated through creating positive image of education and highlighting its impact on income generation. Improving infrastructure like building more

schools, appointing better teachers, improving teaching materials etc. can also help the process.

### 5. Conclusion

The importance of education is undeniable as Bangladesh is aiming to graduate to middle income nation by 2021. While enrollment in primary school is almost 100%, retention rate is not very high. Many students drop out before completing 5<sup>th</sup> grade. One explanation of such behavioral pattern is that after a certain stage stipends are no longer effective in keeping children in schools as opportunity costs begin to escalate. This study has demonstrated that conditional stipends will be effective in increasing participation only if the transfer amount is sufficient to compensate household's loss of utility when complying with program conditions. This gives a rational economic explanation of dropout of students forgoing CCT program. The model also demonstrates that greater cost efficiency can be achieved as the CCT threshold ensures that the transfer amount is neither too much nor too less. This theoretical exercise indicates that stipends are not sufficient to keep children from ultra-poor households in school once they cross the certain income threshold, indicating that the opportunity cost of schooling trumps the net benefits of the stipend programs. However as the marginal cost of stipend increases with rising educational requirements, governments should focus more on using advertisement to persuade household to invest in education for their children. To the best of the authors' knowledge these results are novel at theoretical level.

One main limitation of this study is lack of data. Since the authors did not collect the data used in this study themselves, and data collection (designing survey) was not done keeping these theoretical results in mind, the authors cannot claim that the data set used is perfectly suitable for this test. The study can be further extended by introducing new data set (preferably panel data) collected for testing the recommendations of this study.

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