Graduate School of Development Studies

Exploring Impact on Landholdings, Health and Income of the Ultra Poor in Bangladesh

Evidence from CFPR-TUP Program

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List of Acronyms

BRAC	Bangladesh Rural Advancement Committee
BBS	Bangladesh Bureau of Statistics
CBN	Cost of Basic Needs
CFPR-TUP	Challenging the Frontiers of Poverty Reduction-Targeting the Ultra Poor
CIDA	Canadian International Development Agency
DFID	Department for International Development
DID	Difference-in-Differences
FAO	Food and Agriculture Organization
FEM	Fixed Effects Model
HIES	Household Income and Expenditure Survey
IGA	Income Generating Assets
IGVGD	Income Generation for Vulnerable Group Development
MDG	Millennium Development Goals
NGO	Non-government Organization
OLS	Ordinary Least Square
PWR	Participatory Wealth Rank
RD	Rural Development
RED	Research and Evaluation Division
REM	Random Effects Model
UN	United Nations
VGD	Vulnerable Group Development
WFP	World Food Program

Abstract

This paper attempts to provide an understanding to what extent institutional change of the functioning of microfinance influences some specific outcomes of interventions like landholdings, health and income of the ultra poor in Bangladesh. It examines impact of the 'Challenging the Frontiers of Poverty Reduction-Targeting the Ultra Poor' (CFPR-TUP) program on those outcomes using a large balanced panel dataset (2002, 2005 & 2008) from rural Bangladesh. The main objective of this paper is to examine short- and long-term impact on landholdings, health, income and distribution of income of the ultra poor using conditional and unconditional difference-in-differences (DID). In addition, fixed effects estimation is also applied to check the robustness of our estimates on certain outcomes like total landholdings, access to land, land-man ratio, chronic food deficit, income and its distribution. In particular, this paper examines the distinction between treatment and control group in base year and the impact on coping ability. This study uses two different units for measuring the impact on landholdings: proportion of households and decimal. This study (based on proportion) finds the robustness of impact estimates in the long-term for homestead, cultivable and total landholdings using both DID approaches, which also find short- and long-term robust impact for cultivation of others' land, access to land and leasing. After using decimal as a unit of measurement, we find the long-term robust impact on homestead, total land owned, access to land and land-man ratio. Here we do not find robust impact on cultivable land and cultivation of others' land both in short- and long-term. Fixed effects method is applied along with DID on total land owned, access to land and land-man ratio. The findings suggest that the CFPR has robust impact on total land owned, access to land and land-man ratio only in the long-term irrespective of the approaches. To check the channel between landholdings and food security, fixed effects method is applied only for chronic food shortage and DID methods are applied to all self-perceived food safety issues like chronic and occasional food deficit, break-even and food surpluses. All three approaches provide very much consistent results for short- and long-term impact. All three approaches validate robustness of impact on chronic food deficit suggesting households belong to the program face significantly less chronic food shortages compared to the control. Based on DID approaches, it finds though the CFPR contributes to chronic food security, it accelerates occasional food insecurity. All three approaches confirm the significant impact of the CFPR on income both short- and long-term. However, this study finds no consistent and significant impact on the distribution of income except the richest quintile. The findings from distribution of income suggest the CFPR is working for those living in the richest quintile. Finally, this study finds the significant impact of the CFPR on investment in health and consciousness indicator like usage of sanitation though we are suspicious about its sustainability. The CFPR program therefore has sustainable impact on landholdings, income those living in the richest quintile, health investment and to some extent, on coping ability.

Relevance to Development Studies

Recently, impact assessment has received increasing attention in policy making in both developed and developing country contexts as it helps to answer key questions for evidence-based policy making: what works, what doesn't, where, why and how much? It is an important component of evaluation tools and integral to efforts to improve the effectiveness of the asset transfer program like BRAC's 'Challenging the Frontiers of Poverty Reduction-Targeting the Ultra Poor' (CFPR-TUP) program in improving the living standards of the most shock-prone and disadvantaged segment of the population, the vulnerable ultra poor in Bangladesh and thus playing a crucial role in the study of development economics. Previous studies have demonstrated the CFPR impact but not much is known about the channels that link the program inputs and the poverty impact. Existing studies have so far also neglected the long-term impact of the CFPR on landholdings, health and distribution of income of the ultra poor households in rural Bangladesh in detail. This paper addresses these two gaps, which would be important in policy implications for re-shaping the existing policies and interventions and thus promoting livelihoods of the ultra poor.

Keywords

Impact, Short-term, Long-term, Ultra poor, Land, Health, Income, CFPR, BRAC, Bangladesh

Chapter 1 Introduction

1.1 Introduction

As in many developing countries, Bangladesh has well-known programs targeted at the ultra poor like Vulnerable Group Development (VGD) and Rural Development (RD) of the World Food Program (WFP) and BRAC's 'Challenging the Frontiers of Poverty Reduction-Targeting the Ultra Poor' (CFPT-TUP)[1]. CFPR has some distinct characteristics as it has combined its methodology for its beneficiary selection from prior field experiences and empirical research and provides not only income generating assets (IGAs), but also other complements like stipend to reduce opportunity cost, training, health care and support from local elites. A growing number of past studies (Raza et al., 2011, Das and Misha, 2010, Ahmed et al., 2009b & Rabbani et al., 2006) have examined impact on poverty of the CFPR but not much is known about the channels that link the program inputs and poverty impact. Existing studies have so far also neglected the long-term impact of this program in detail, especially on landholdings, health and distribution of income. This paper addresses these two gaps using a large panel dataset collected by BRAC-RED[2] in three rounds (2002, 2005 & 2008). CFPR provides IGAs and health care to the ultra poor households to increases their capital stock and thus the return. It then encourages investing more in health and landholdings to increase income, which in turn, help the ultra poor to exit poverty in a sustainable way. CFPR, therefore, has potential impact on landholdings, health and income of the ultra poor as it channels its inputs to these desired outputs.

Land is the key component of natural assets to the rural ultra poor as it plays decisive role not only to their livelihood outcomes like income and food safety, but also to have a permanent residence and security. Landlessness explains the reason of high concentration of ultra-poverty in rural Bangladesh. Though absolute landlessness over the last decade is decreasing, functional landlessness, in terms of not owning cultivable land, is increasing (Rabbani et al., 2006). Agricultural land in poor countries plays crucial role in the daily livelihoods of the vast majority of the people, especially the poor (Bardhan and Udry, 1999). Nevertheless, land transaction in the poor countries in terms of buying and selling is very low due to weighty stock to the wealthiest person, but it is more active in lease market. However, ultra poor in Bangladesh is more likely to be excluded from lease market because of their negligible asset base for the functioning of land. It is evident that ownership and/or access to land can help the ultra poor to grow more food, increase in income and to

[1] CFPR-TUP is a donor consortium made up of the CIDA, DFID, Oxfam Netherlands and the WFP, AusAid, and BRAC. This project is conducted by Bangladesh Rural Advancement Committee (BRAC). This study uses CFPR-TUP or CFPR interchangeably.
[2] BRAC-RED implies Research and Evaluation Division of BRAC.

have permanent residence and security. Thus outcomes derived from land endowment are crucial helping poor to exit poverty in a sustainable way. This study measures impact of the CFPR on landholdings using proportion of households owning land and decimal as units of measurement. Similarly, health is one of the key components of human assets and forms a complement to natural assets like land. The importance of health is also evidenced in human capital, human development and also in the millennium development goals (MDGs). This is why people place a high value and concentration on health. Generally, a healthier person is capable of producing more which is reflected in the labor market rewards (ibid). This implies improvement in health increases a person's productivity and thus the income and ultimately establishes a very strong association between income and well-being. However, there is a joint causation between income and investment in health and this generates an intergenerational 'poverty trap' for the ultra poor as they are unable to invest in health, and thus earn low incomes and remain chronically poor. Therefore, the joint causation of human capital investment and income provides a theory of the distribution of income, which can be found in Chapter 10 (Bardhan and Udry, 1999). Thus, the improved health status plays a key role helping the ultra poor to exit poverty in a sustainable manner. This paper not only looks to what extent the two fundamental endowments- land and health- allow to increase income in the long run but also how these assets help to cope with shocks. As existing studies on impact assessment of the CFPR have neglected the coping ability of the ultra poor, this paper also addresses this gap.

Livelihood outcomes of the ultra poor like land, health and income are shaped by their vulnerability to idiosyncratic and covariate shocks. This study defines shocks as unpredictable external or crisis events that may weaken economic status of the ultra poor, which in turn, worsen their well-being. Whereas land transaction in rich countries is related to life-cycle, it is rare in inter-generationally close-knit families in the poor countries like Bangladesh (Bardhan and Udry, 1999). Distressed sale of land and large out-of-pocket expenditure are frequently found in ultra poor households for facing such crises as traditional-reciprocity based risk-coping mechanisms are getting weaker. Coping ability of the ultra poor therefore needs to be addressed for policy implications. Generally, more capable households spend more to recover from shocks. This paper uses two indicators for measuring coping ability: spending behind shocks and time to recover. More spending and earlier recovery from shocks implies more capability of the ultra poor.

Ellis (2000) asserts that crises, risks and vulnerabilities are inter-linked concepts. Morduch (1990) in Kochar (1995) asserts that inter-households differences in vulnerability to shocks are strongly associated with differences in access to credit. As CFPR is recognized as 'ladder to microfinance', it is important to look at impact of the CFPR on coping ability of the ultra poor. This study argues CFPR has sustainable impact on landholdings, health, income and coping ability. I attribute this to CFPR as it enables ultra poor to smooth such shocks through cash transfers and continuous support from local elite and BRAC at the time of natural devastations. Thus, enhanced coping ability to smooth impact directly reduces the need to resort to the *ex post* sale

or depletion of assets or to costly *ex ante* measures in order to buffer income from shocks.

This study uses a large panel dataset from Bangladesh, spanning about 6 years, to examine impact of the CFPR on landholdings, health, and income of the ultra poor. This panel dataset maintains a control group since base year and thus it is not required to construct an artificial counterfactual. We strongly assume the validity of parallel trend assumption based on literature and homogeneity in nature of poverty. As longitudinal micro data sets look intensely into factors at individuals and households that contribute to design appropriate policies, this rationale interested me working with such dataset collected by BRAC-RED from ultra poor households in rural Bangladesh to explore impact and its sustainability. This study explores impact of the CFPR on landholdings, health, income and coping ability both for short- and long-term.

The remainder of this chapter comprises two parts: Firstly, it defines ultra-poverty[3] and poverty dynamics in Bangladesh. Secondly, it focuses on BRAC and context of the CFPR. Chapter 2 outlines the empirical literature and theoretical framework. Chapter 3 draws on empirical data, institutional setting and descriptive statistics. Chapter 4 explores the model specification for impact assessment of the CFPR, regression results are analysed in chapter 5 and finally, the summary and conclusion.

1.2 Who are the Ultra Poor? Poverty Dynamics in Bangladesh

As there is no universally accepted definition for the ultra poor, different studies use their own concepts and approaches. Lipton (1983) first used the term 'ultra poor" to mean those who spend 80% of their total expenditure on food and cannot attain 80% of standard calories required. World Bank (1996) in Halder and Mosley (2004) defines ultra poor as those who have no own land or house, no other income sources except manual labor, no savings, no capacity to have three meals a day, no affordability to have minimum clothing and to invest in human capital. A further study by the World Bank (1998) sub-divides the extreme poor as the destitute and the ultra poor based on kilo calorie (kcal) consumption per person per day. While the first category, the destitute, consume less than 1600 kcal and are unable to fit for any development intervention, the second category, the ultra poor, consume less 1805 kcal but more than 1600 kcal and physically fit for work. This study uses HIES[4] data and finds that out of 36% extreme poor, ultra poor and destitute comprise 31% and 5% respectively. Rahman and Razzaque (2000) have incorporated multidimensionality for addressing the ultra poor such as income, occupation, housing, physical assets, geography, sex of the household head and dependency ratio. Sen and Begum (1998) focused more on the three important

[3] This study uses the terms 'ultra poor' and 'extreme poor' synonymously.

[4] HIES stands for Household Income & Expenditure Survey, Bangladesh

indicators like land, housing and occupation for identification of the ultra poor. Khandker and Chowdhury (1996) use the FAO standard of 2,112 (kcal) per person per day and identify the extreme poor based on consumption which is Tk. 5,270 per person per year. Therefore, there are distinctive characteristics and causes of being ultra poor, who find it considerably difficult to move out of ultra-poverty and is usually excluded because of their asset-base or irresponsive to the traditional anti-poverty interventions (Marsden H., 2010). Thus, the ultra poor lack ownership in homestead or agricultural land and IGAs. They usually own a very little or even not any amount of land and live in an unhygienic environment like *jhupri* (made up of straws). This study follows the World Bank's definition (1996; 1998) as it captures land, health, income, and food safety issues, on which we assess impact of the CFPR. Key characteristics of the ultra poor in Bangladesh are summarized in table 1.a.

Table 1.a- Key Characteristics of the Ultra Poor

Characteristics	Statistics
No land (% of HH)	9.8
10 decimal land(% of HH)	50.3
Average agricultural day labor per HH	0.5
Average non-agricultural day labor per HH	0.4
Female headed household (%)	10.8
% with primary education per household (14^{+} years)	21.7
% with literate per household (6+ years)	29.7

Source: Matin et al. (2008).

Though poverty reduction rate is somewhat impressive in Bangladesh over the last few decades, ultra-poverty situation remains at 25 percent around in 2005. The upper and lower poverty lines use the Cost of Basic Needs (CBN)[5] that makes clear-cut distinction between the moderate and extreme poor. While the proportion of population below the upper poverty line declined by 18 percentage points between 2000 and 2005, the rate of decline in extreme poverty for the same time period was 27 percentage points (HIES, 2000 and 2005). Nevertheless, the ultra poor issue remains a key challenge in Bangladesh as the overall incidence of ultra-poverty persists at a high level. The incidence of ultra-poverty is almost twice in rural than the urban and thus this study considers rural ultra-poverty. Table 1.b shows poverty dynamics in Bangladesh.

[5] CBN defines values of consumption needed to satisfy minimum subsistence needs. Estimates developed by the Bangladesh Bureau of Statistics (BBS) jointly with the World Bank (WB).

Table 1.b- Dynamics of Head Count Rate of the Incidence of Poverty in Bangladesh

Reference Year	Upper Poverty Line[6]			Lower/Ultra Poverty Line[7]		
	National	Urban	Rural	National	Urban	Rural
1991/92	56.6	42.7	58.7	41.0	23.6	43.7
1995/92	50.1	27.8	54.5	35.1	13.7	39.4
2000	48.9	35.2	52.3	34.3	20.0	37.9
2005	40.0	28.4	43.8	25.1	14.6	28.6

Source and Note: Different rounds of HIES. Calculation used Upper and Lower Poverty Lines of 2005 adjusting price changes between years.

1.3 BRAC and the Context of CFPR[8]

BRAC, a development organization, was established in 1972 and then the organization known as Bangladesh Rehabilitation Assistance Committee (BRAC) and begins relief and rehabilitation operations following the end of Bangladesh's war of liberation in 1971. In 1973, BRAC transformed its activities from relief and rehabilitation to long-term community development and was renamed as Bangladesh Rural Advancement Committee (BRAC). It begins microfinance in 1974, which is still now the core activity among many others like health, education, social justice, agriculture, fisheries and sericulture etc. In 1979, the rural outreach credit and training programs were launched. The income generation for vulnerable group development (IGVGD) was launched in 1985. The rural development program was formed by merging the rural credit and training program and the outreach program in 1986. In 1990, the sustainable rural credit program was initiated and this is referred to as phase II of the rural development program and phase III and IV was initiated in 1993 and 1996 respectively. Urban area came under consideration of BRAC'S development program in 1997. BRAC, in course of time, has emerged as one of the biggest NGOs in the world and is dedicating to poverty-alleviation through empowering people and communities in situations of poverty, illiteracy, diseases and social injustices. BRAC aims to achieve positive changes through economic and social programs.

Today, Bangladesh has a comprehensive portfolio of public safety net programs to assist the poor including the transfer of food, cash or both (Ahmed et al., 2009a). However, table 1.b shows over a quarter of Bangladesh's people live in ultra-poverty and larger incidence of ultra-poverty in rural areas. They are not able to meet even the barest of their basic needs, fail to fulfill the minimum calorie intake, and are in frequent bad health which causes further drain on their inadequate resources due to income loss and out-of-pocket expenditure for shocks. Ultra-poverty also has a clear gendered face

[6] Upper poverty line applies to those who are moderately poor.

[7] Lower poverty line applies to those who are extremely poor.

[8] BRAC history is summarised from its own website and different annual reports. Available at http://www.brac.net/

where most of them are widowed, divorced, separated and abandoned, who are caught in a 'vicious poverty trap' and the victim of social injustices and insecurity (Matin et al. 2008). The constraints that they face are different from those who are moderately poor. These challenges drove BRAC to re-think their existing development strategies and interventions for the ultra poor and come up with new intervention strategies. BRAC took 'push down' initiative to reach the ultra poor through an experimental program in 2002 called "Challenging the Frontiers of Poverty Reduction-Targeting the Ultra Poor" (CFPT-TUP), which is designed to improve their immediate situation by providing IGAs, enterprise development training, stipends, social development and other skills to move out of ultra-poverty, reduce vulnerabilities and smooth income and consumption. Addressing constraints that the ultra poor face, building assets, improving skills and health, educating their children and getting their voices heard are the prime motives of the CFPR to way out of ultra-poverty and of poverty ultimately.

Multifaceted structures of constraints that the extreme poor face keep them in chronic illness and poverty and they are termed as 'Ultra Poor" by BRAC. Microfinance and the social protection policies find difficulties to address them (Hossain and Matin, 2007). Market-related opportunities, government social policies, and NGOs overlook the ultra poor as they lack in assets, and/or they live in areas or belong to ethnic groups that are excluded. The ultra poor are not a distinct group, but a heterogeneous assemblage of different people experiencing multiplicity of deprivations. Rural people living in remote areas, disadvantaged women, casual labors, migrants or displaced people, ethnic minorities, older people and those with severe disabilities or ill-health are commonly recognized as ultra poor. For analytical purpose, we can recognize both economically active and inactive ultra poor. The economically inactive ultra poor are the frail old people, physically or cognitively impaired, chronically ill or the destitute. However, BRAC's CFPR has chosen to include the economically active ultra poor who are surviving through precarious, multiple livelihoods and aims to enhance economic and social capabilities.

BRAC launched CFPR in January 2002 as an experimental basis after recognizing two key findings from field and empirical knowledge.

1. BRAC's programs hardly reach the ultra poor due to self-exclusion, social exclusion and loan-driven approach.
2. BRAC's collaborative IGVGD with the WFP in 1985 used 'laddered strategic approach' to climb out of poverty by graduating to BRAC's microfinance. However, 30% of IGVGD beneficiaries did not graduate to microfinance due to their vulnerabilities (Webb et al., 2001).

These indicate that programs were facing difficulties to assist the ultra poor. CFPR was incepted from BRAC's commitment working for their better livelihoods and uses the concept 'laddered strategic linkage' to enable the ultra poor by developing new and better options for them. Both promotional (e.g. asset grants, training) and protective (e.g. stipends, health care) approaches are undertaken along with addressing socio-political constraints at various levels. CFPR has employed two broad strategies 'pushing down' and 'pushing out' (Matin et al., 2008), where the first one combines participatory approaches with simple survey based tools to push down the reach of development

programs and the second one pushes out the existing domain of microfinance to address new dimensions of service delivery. Table 1.c clarifies and summarizes the CFPR program theory.

Table 1.c- Components and Objectives of the CFPR

Components	Beneficiaries received	Duration of support	Objectives
Asset transfer	Assets for enterprise e.g. cow, goat, poultry, nursery, non-farm assets etc. (on average Tk. 6,000 per beneficiary)	One-shot at the beginning of the program	Significantly increase the household's asset base for income generation
Enterprise development training	Hands-on training by enterprise management and technical supervision	2 years	Ensure good return from asset transferred
Support for enterprise	All inputs required to maintain the enterprise	The first cycle of the Enterprise	Ensure good returns from the asset transferred
Weekly stipend	70 Taka	(Enterprise specific) Until start getting income from their enterprise	Smooth consumption, reduce vulnerability, and reduce opportunity costs of asset operations
Health care support	Free medical treatment; Regular visits by health volunteers (*Shasthyo Shebika*) for preventive diseases	2 years and continues with BRAC mainstream development program	Reduce morbidity and vulnerability
Social development	Awareness raising training	2 year and continues with BRAC's mainstream development program	Build confidence and raise knowledge and awareness of rights
Mobilization of local elite for support	Community supports material, information, guidance	2 year and continues	Create a supportive and enabling environment

Source: Adapted from Hossain and Main (2007) & Ahmed et al. (2009b)

Certain exclusion and inclusion criteria must be met to be selected as a CFPR program beneficiary. Table 1.d shows that exclusionary conditions are stricter than that of inclusions as all exclusion conditions must be met where at least three inclusion conditions should be fulfilled by the households in order to be selected as a beneficiary. Households that meet both exclusion and inclusion criteria come under CFPR and receive components. Targeting indicators are clarified in table 1.d.

Table 1.d- Targeting Indicators of the CFPR

Exclusion conditions (selected households must satisfy all conditions)	1. Not borrowing from a microcredit-providing NGO.
	2. Not receiving benefits from government programs.
	3. At least one adult woman physically able to put in labor towards the asset transferred.
Inclusion conditions (selected households must satisfy at least three conditions)	1. Total land owned less than 10 decimals.
	2. Adult women in the household selling labor. (In Phase II, changed to 'Household dependent upon female domestic work or begging'.)
	3. Main male income earner is disabled or unable to work. (In Phase II, changed to 'No male adult active members in the household'.)
	4. School-aged children selling labor.
	5. No productive assets.

Source: Matin et al. (2008)

The main objective of this paper is to assess the impact of the CFPR on landholdings, health, income and its distribution by quintile of the ultra poor households in Bangladesh. In this pursuit, this study attempts to observe the possible impact on those outcomes answering the question: What are the CFPR impacts on landholdings, health and income? In particular, this study looks to what extent selected ultra poor (Treatment) differs from Non-selected ultra poor (Control) in the base year and also to what extent the CFPR helps the beneficiaries to cope with shocks i.e., coping ability.

Chapter 2 Literature Review and Theoretical Framework

2.1 Literature Review

Recent studies have examined impact of the CFPR on poverty, asset pentagon, per capita income, consumption and food security of the ultra poor but not much is known about the channels that link the program inputs and the poverty impact. Existing studies have so far also neglected the long-term impact of the CFPR, especially on landholdings, health and distribution of income. Robustness check and theoretical linkages in the existing impact assessment studies of the CFPR are almost absent. The purpose of this section is to review the existing literature that assesses the CFPR and other similar social sector programs in Bangladesh.

Das and Misha (2010) have explored the sustainability assessing impact of the CFPR on income, employment, food security and asset holdings, where they find the significant impact on income and assert that it does not vary significantly after controlling the household characteristics. This is similar to the findings in Emran et al. (2010), Raza et al. (2011) and Rabbani et al (2006). As impact on income might differ among different groups of the ultra poor, it needs to explore impact of the CFPR on distribution of income by quintile. However, none of these studies estimated such impact. For impact assessment on landholdings, Das and Misha (2010) have constructed land index, which comprises own homestead, cultivable and uncultivable land, and find significant long-run impact. This is similar in Emran et al. (2009) for homestead and Raza et al. (2011) for homestead and cultivable land, but contrasts with Rabbani et al. (2006) and Ahmed et al. (2009b), where they find no impact on cultivable in the short-term. Thus it requires to explore the impact of the CFPR on landholdings both for short-and long-term. However, access to land is not only determined by these three components, but also by the access to cultivation of others land, mortgage in and out, lease in and out etc, which are completely ignored in Ahmed et al. (2009b) and also in Das and Misha (2010). Most of the impact studies (Ahmed et al., 2009b; Das and Misha, 2010; Raza et al. 2011 and Rabbani 2006)) on CFPR have focused only on chronic food deficit, but other dimensions like occasional food deficit, break-even and surpluses are neglected. They have found similar result that CFPR plays role in mitigating the chronic food deficit. Thus it requires exploring impact also on other dimensions of food security or insecurity in a sustainable manner. In the same study, Das and Misha find the significant positive impact on usage of sanitation, which is similar in Ahmed et al. (2009b) and working days lost, but little is known about the CFPR impact on morbidity and coping ability in detail. Ahmed et al. (2009b) find no significant impact on cultivable land, but they find significant impact on lease-in. However, this study lacks in providing details about food security issues, landholdings and morbidity issues. Even it requires addressing their findings from long-term perspective as there

are many contrasting views. Their estimates are no beyond question for robustness.

Gosh et al. (2011) have examined poverty and food security in Bangladesh using longitudinal data and assert average farm size has reduced during 2002-2008 in both riverbank and comparison area and overall poverty situation is significantly influenced by cultivable land. They strongly emphasize on agricultural intensification for alleviating poverty and ensuring food security. However, this study suffers severe shortcomings in impact assessment methodology as it uses only descriptive statistics.

A good deal of evidence (Hulme and Moore, 2007 and Rabbani et al., 2006) indicates ultra poor are typically in the worst form of vulnerability and well-being and usually excluded from microfinance (Amin et al., 2003). Alamgir (1998) in Halder and Mosley (2004) asserts ultra poor have no agricultural land or even homestead and no income source or very irregular income. Their poverty persistence is correlated with dependency ratio and adverse events (Ali, 2008). People living in low-income setting are more likely to be affected by health shocks (Strauss and Thomas, 1998 and Gertler and Gruber, 2002). Therefore, vulnerability of the ultra poor is evidenced in all studies due to lack in asset base to cope with crises. As CFPR's main objective is to enhance capability of the ultra poor, we need to address to what extent CFPR allows to increase coping ability, which is less focused or even absent from long-term perspectives.

The two large targeted food programs in Bangladesh – the VGD and the RD– started aiming to increase income and grain consumption of the selected ultra poor, but they are found inefficient in delivering food transfers (Ninno, 2001). The VGD is a national targeted food aid program for the poor women and the RD is a self-targeting public works program which provides employment remunerated with grain and cash for the rural poor. Even though social protection provisions like VGD and RD are designed for the ultra poor, but unfortunately not all resources reach the intended beneficiaries (ibid). The findings imply the ineffectiveness of the selection criteria and misallocation of resources. The CFPR is distinct as it includes the ultra poor through applying proper methodology in the selection process, which is evidenced in Sulaiman and Matin (2006) that about three quarters of beneficiaries of the CFPR belong to the poorest quintile, which is rare in other similar programs in Bangladesh. There are a growing number policies like food stump transfer and livelihood support for improving the food intake of the poor in Bangladesh (Haseen and Sulaiman, 2007). Hashemi (2001) in Haseen and Sulaiman (2007) observes the success for IGVGD in short-term, but unsuccessful in long-term. As impact might differ from short- to long-term, it is necessary to evaluate impact of the CFPR on a long-term basis.

Though Bangladesh has well-known programs targeted at the ultra poor, very few studies have examined impact on poverty of the CFPR but not much is known about the channels that link the program inputs and the poverty impact. Existing studies have so far also neglected the long-term impact on landholdings, health, and distribution of income and coping ability of the ultra poor. Most of the existing studies suffer serious shortcomings in theoretical relevance. Check for the robustness is almost absent in those studies. Thus the

extent and persistence of ultra-poverty in rural Bangladesh require focused attention and actions. This rationale interested me working with impact assessment of the CFPR with a detailed focus on landholdings, health, income and coping ability to reveal the facts and policy options for them.

2.2 Theoretical Framework

This section focuses to what extent functioning of the CFPR is linked to the existing theories in development literature. This study uses the sustainable livelihoods framework and the program theory for assessing impact on landholdings, health and income of the ultra poor in Bangladesh. Through the application of sustainable livelihoods framework and program theory, this paper shows how the CFPR contributes to the long-term impact, which in turn, helps the ultra poor to exit poverty in a sustainable way.

This study is linked with different theoretical perspectives. For example, Amartya Sen argues 'Capability to function' is the authentic indicator to detect whether a person is poor or non-poor (Todaro and Smith, 2009). As the ultra poor lack in 'functioning', CFPR provides IGASs and health care, on which they have complete ownership, to enable ultra poor for better 'functioning', which is the most important aspect of bringing 'well-being' in them. This study, at first, aims at focusing on whether increased capabilities are reflected by impact of the CFPR on landholdings, which is most important for the ultra poor in rural Bangladesh. Secondly, it looks at income though it does not suffice as a measure of well-being. However, this is the only indicator that is widely used not only for measuring well-being, but also for converting the commodities into functioning (ibid). Thirdly, it focuses on the morbidity and capability perspectives, which are directly linked to 'capability to functioning'.

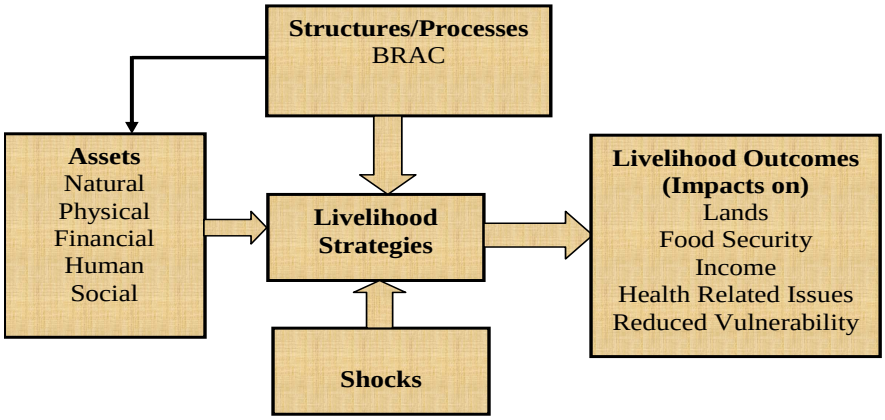
The idea of 'convergence' in economics is also referred to as "catch-up effect" which hypothesizes that the poorer economies' per capita incomes will tend to grow at faster rates than that of richer economies and eventually poorer economies converge to the rich economies due to technology transfers by the rich to the poor and low of diminishing returns to capital in the rich economies. Though the "Catch-up" effect is widely used in macro literature, this could be replicated in micro analysis if the groups are different and there is sufficient time-lag. As we are concerned with assessing impact considering a control group which is better off than the treatment, we need to focus whether the 'gap' in different outcomes like land, health and income is reduced over the years. This is possible if outcomes of the treatment grow at faster rates than that of the controls. It is, therefore, worthwhile to observe whether the "catch-up effect" for the CFPR exists or not.

Evidence shows the CFPR enables the ultra poor to break out of the "Vicious Circle of Poverty", pioneered by Ragnar Nurkse in 'Problems of Capital Formation in Underdeveloped Countries'. It states that the problem of economic development is largely a problem of capital accumulation. As capital accumulation is central to the focus of most of the theories in development economics, CFPR plays an important role providing capital assets to the ultra poor to increase their capital base which, in turn, increases income and uplift

their livelihoods and finally, the coping ability. All these, indeed, help ultra poor to break out of the 'Vicious Circle of Poverty'.

This study uses the sustainable livelihoods framework, pioneered by Ellis (2000) as it is closely linked to functioning of the CFPR. Different types of assets owned by the ultra poor households contribute to their better livelihoods. However, these assets are combined with exogenous shocks and institutional structures & processes. This combination then determines the livelihood outcomes on which well-being of the ultra poor depend. The combination of assets with institution (BRAC-CFPR) and shocks determines the livelihoods strategies of the ultra poor and this, in turn, determines the livelihood outcomes. The modified livelihood framework shows how BRAC-CFPR plays role for better livelihoods of the ultra poor. It shows all effects go through the assets and the strategies. BRAC-CFPR directly contributes to the capital formation in terms of assets and livelihood strategies. Modified version of it is shown in figure 1.

Figure 1- The Sustainable Livelihoods Framework



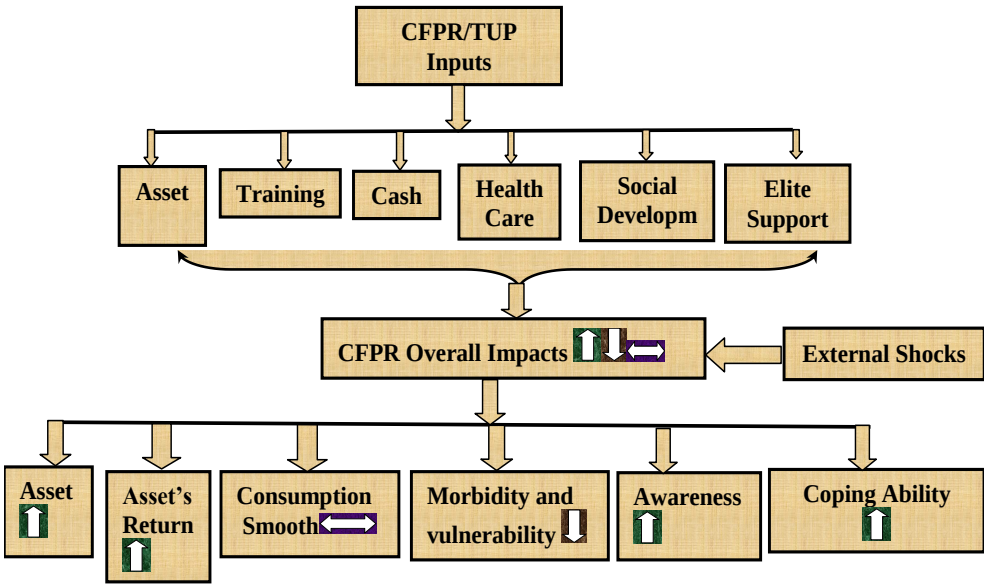
Source: Modified from Ellis (2000)

The CFPR interventions are linked to several parts of the sustainable livelihoods framework and facilitate processes and accesses to resources by expanding asset pentagon of the ultra poor. Health care provision and stipends reduce the vulnerability of participating households in the CFPR. The combination of all impact works for better options, better livelihood strategies and better outcomes.

Analytical framework using CFPR program theory is shown in figure 2, which indicates the flow of key issues relating to impact assessment. Households under CFPR receive inputs like IGAs, enterprise development training, cash, health care, mobilization and local elite's support. These inputs are used in CFPR's production process and the resultant outputs are indicated by overall impact on increase in asset and asset's return, consumption smoothing, reducing vulnerabilities and morbidity and also rising awareness. All these together strengthen the coping ability of the program beneficiaries. This study would cover the impact on landholdings, health and income. As the

perceived shocks affect the overall impact, this study explores impact on coping ability of the ultra poor. This simplified program theory is shown in figure 2.

Figure 2- Simplified Program Theory of the CFPR



Source: Author's own

Chapter 3
Data, Setting and Descriptive Analysis

3.1 Data

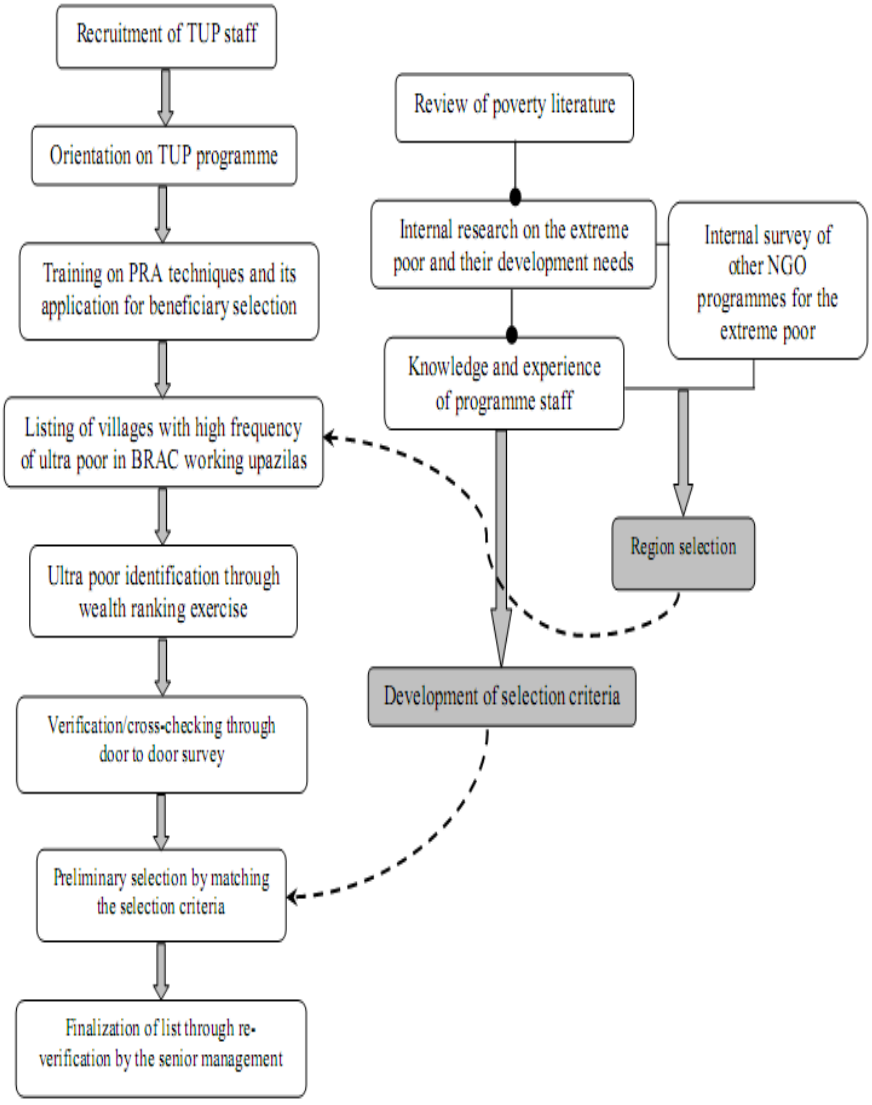
This study uses quantitative data to analyze impact of the CFPR on landholdings, health, income and coping ability of the ultra poor households. The setting for the analysis is Bangladesh. The longitudinal data on which this study is based builds on the three wave surveys (2002, 2005 & 2008) conducted by BRAC-RED to evaluate short- and long-term impact of the CFPR on landholdings, health, income and coping ability of the ultra poor. Data collection methodologies are well-described in Shams et al. (2010), Das and Misha (2010), Rabbani et al. (2006), Matin and Halder (2004) and Matin (2002).

The reform in microfinance itself has a long history. The latest innovative approach (inclusive microfinance), undertaken by BRAC in 2002 with the assistance from donor consortium, is likely to impact the livelihoods of ultra poor. This raises issue to adopt proper methodology for measuring impact of the CFPR on landholdings, health, income and coping ability of the ultra poor. BRAC-CFPR aims explicitly at reducing vulnerabilities and improving socioeconomic and political asset base through promotional and protective approaches (Matin and Halder, 2004). As different studies indicate programs targeted at the ultra poor in Bangladesh suffer severe shortcomings in the selection process and distribution of assets, targeting approach and beneficiary selection process should be fair and effective. For introducing CFPR in all the sub-districts of the three northern districts of Bangladesh (namely, Rangpur, Nilphamari and Kurigram)[9]. BRAC has combined various targeting methodologies and knowledge streams for fair and effective targeting. BRAC has used its extensive network of regional offices at the district level, area offices (AO) and branch offices (BO) at the sub-district (*Upazila*) level and below for selecting the ultra poor. Local knowledge from AO level is used to draw a list of clusters within their working area, where NGO operations are relatively low and poorer households are clustered. A team consists of TUP POs have visited these clusters, built up rapport and arrived at a final list of clusters called 'spots' or participatory wealth rank (PWR) spots located in the villages. For the PWR exercise, maximum size of such a PWR exercise is deemed not to exceed 150, which is a natural limit to the size of each spot (ibid). The clusters which are predominantly inhabited by better-off people are possibly excluded. Once the PWR is done, a survey is administered in bottom-most two wealth categories. The collected information from this survey is

[9] Sub-districts are selected based on district level income poverty and human poverty indices. All three districts fall in the highest group in terms of income poverty in its first phase (see bids, 2000) in Matin and Halder (2004).

tailored with CFPR's exclusion and inclusion criteria in order to prepare a preliminary list for potential beneficiaries, which is cross-checked by a team of managers at the different levels by visiting the potential beneficiary households to arrive at a final section. The selection process is well-documented in Matin and Halder (2004).

Figure 3- Simplified Selection Process of the CFPR



Source: Matin and Halder (2004)

BRAC-RED carried out a baseline survey for the CFPR from June to August 2002 as a part of its evaluation plan. The survey includes both the program and control households from 27 villages located in 3 out of Bangladesh's 64 districts. The CFPR has selected the ultra poor through PWR, where households living in the poorest category are considered as ultra poor though sometimes the poorest two categories are considered (Das and Misha, 2010). Among these ultra poor, those are finally selected for the CFPR known as selected ultra poor (SUP or Treatment) and those are excluded are the non-selected ultra poor (NSUP or the Control). The NSUP households are also surveyed to represent the control group for the CFPR. Though both categories are recognized as ultra poor by the PWR, NSUPs are excluded from having benefits from the program as they are relatively better off. The effectiveness of selection of the treatment and control through PWR is evidenced in Sulaiman and Matin (2006).

In baseline survey, the sample size was 5,626 households of which 2,633 were treatment and 2,993 were control. The survey questionnaire was administered to the woman or the wife of the household head. In 2005, RED re-surveyed a total of 5,228 households of the 5,626 households surveyed in 2002 to construct the 2002- 2005 panel. The 2005 follow-up survey included 2,474 treatment and 2,754 control households. The overall attrition is 6% where it is 7.98% for control and 6.04% for treatment. Whether impacts are sustainable or not, RED re re-surveyed a total of 4549 households of which 2,251 were treatment and 2,298 were control households. The attrition rates were 16.56% and 9.01% for control and treatment group respectively. The overall attrition (2002-2008) is about 20%, which is high. However, attrition is not biased as we still find the significant differences in the outcome variables in the base year between the treatment and control group, which are also evidenced in the previous studies (Rabbani et al., 2006 and Ahmed et al., 2009b). Thus, the attrition or drop out from the sample is random. This study uses the balanced panel of 4,549 households of which 2,251 are treatment and 2,298 are control. It is necessary to compare outcomes for beneficiaries with the outcomes of non-beneficiaries for measuring impact. This requires controlling for the effects of economic and contextual factors that make program beneficiaries systematically different from non-beneficiaries. These factors might include household characteristics (e.g., demographics, skill levels, or social networks) that affect the program impact. Studies that imperfectly control for these characteristics suffer from 'selection biases'. As the program selection was done based on the household characteristics, this study controls only those characteristics and then looks at to what extent the CFPR contributes to landholdings, income, health and eventually, the coping ability of the ultra poor. For assessing the impact, this study uses DID with or without controlling the contextual factors to observe the sensitivity of the impact estimates for desired outcomes. In addition, this study uses FEM as it removes the unobserved effects along with time-invariant explanatory variables. As it assumes unobserved effects are correlated with the time-variant or invariant regressor, FEM is appropriate, which is done by the Hausman test between the FEM and the random effects model (REM). Here the FEM is

appropriate as it is possible to control for all possible household characteristics that do not change over time.

CFPR's main objective is to enable ultra poor for microfinance. As CFPR continues its assistance up to 2 years for that purpose, it is very much relevant to observe the impact both for short- and long-term. Here 'short-term' refers to just before and end of the program (2002-2005) and 'long-term' refers to after 3 years end of the program (2002-2008). Long-term is used to see the sustainability of the impact on the desired outcomes.

For CFPR impact assessment, this study uses different units of measurement. For example, proportion of households and decimal are used as measurement units for landholdings. Most of the existing studies have used only one indicator. Proportion of households is also used for observing the impact on food safety issues. Per capita income is measured by Bangladesh Taka at 2002 constant price. Coping ability is measured in terms of expenses by Taka and time to recover from crisis by month.

3.2 Descriptive Statistics

3.2.1 Key Characteristics of the Sample Ultra Poor Households

Table 3.a presents the means and standard deviations of the key characteristics of sample ultra poor households over the three rounds.

Table 3.a- Key Characteristics of the Ultra Poor Households

Variables	2002		2005		2008	
	Mean	SD	Mean	SD	Mean	SD
Household size	3.78	1.72	4.15	1.83	4.48	1.93
Age of HHH* (years)	43	12.7	45	12.7	48	12.8
Sex of HHH (female=1)	32.4	0.47	35.0	0.48	35.7	0.48
Married HHH (Married=1)	71.7	0.45	68.7	0.46	67.4	0.47
Schooling of HHH (in years)	0.57	1.76	0.57	1.76	0.57	1.76
Literate HHH (Literate=1)	7.5	0.26	7.4	0.26	7.4	0.26
No of earning member	1.62	0.77	1.74	0.89	1.62	0.83
Cash savings	14.5	0.35	61.7	0.49	65.7	0.47
N = 4549						

Note: Author's tabulation. * HHH implies household head.

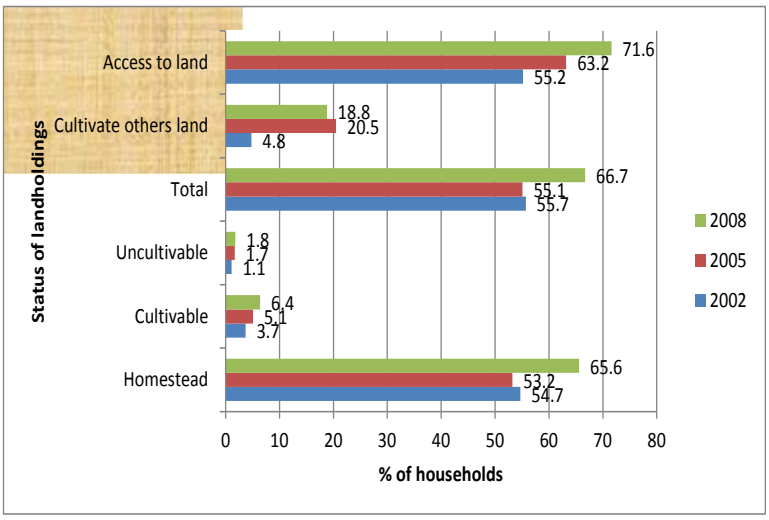
Halder and Mosely (2004) show that average household size tends to be smaller in poor households, which is evidenced in our study. The average household size is 3.78, which is smaller than the national average 4.85 (HIES, 2005). However, our findings reflect an upward trend for average family size. Household heads are around 43 years in baseline. Household heads also had very little schooling – average schooling attainment was 0.57 years. Female-headed households are very common in poorer households, which is evidenced in our finding and justified by inclusion and exclusion criteria of the CFPR that more than 30% of the ultra poor households are female-headed.

The prevalence of widowed, divorced and separated household heads is worth mentioning that only 70 percent of the household heads are married and others fall into those categories. Years of schooling and literacy status of the household heads remain almost constant over time.

3.2.2 Prevalence of landholdings of the Ultra Poor Households

Landlessness is a very common criterion among the ultra poor households in Bangladesh. It is defined here as those who don't won any type of lands like homestead, cultivable and uncultivable. This study reports that around 45% of the ultra poor households are landless in 2002. Findings of agricultural census (2006) in Bangladesh report that among the rural households, 12.85% are landless. Findings from this study imply higher prevalence of landlessness within the ultra poor households in Bangladesh.

Figure 4- Landholdings of the Ultra Poor



The prevalence of landholdings of the ultra poor shown in figure 4 indicates that landlessness decreases over the years due to increased ownership of land like homestead, cultivable and uncultivable. The ownership gain in lands is due to impact of the CFPR, which is to be observed later on in this study. In 2008, landlessness within the ultra poor households is reduced to 35% from 45% in 2002 and 2005 respectively. We find dramatic increase in the access to lands. However, about 30% of the households have no access to this important natural resource, which is reported in table 3.b.

Though owning cultivable land is the desired outcome of most of the rural poor, buying land remains an ambitious goal. Ownership of land in decimal shows increasing trend for cultivable land, which is very essential for food

safety. We find parallel trend for homestead and land-man ratio to the horizontal axis up to 2005 and then they start rising.

Table 3.b- Landholdings Pattern of the Ultra Poor

Variables	2002		2005		2008	
	Mean	SD	Mean	SD	Mean	SD
Landholdings (% of Households)						
Homestead	54.7	0.50	53.2	0.50	65.6	0.48
Cultivable	3.7	0.19	5.1	0.22	6.4	0.25
Uncultivable	1.1	0.11	1.7	0.13	1.8	0.13
Total	55.7	0.50	55.1	0.50	66.7	0.47
Cultivate others land	4.8	0.21	20.5	0.40	18.8	0.39
Access to land	55.2	0.49	63.2	0.48	71.6	0.45
Access for leasing	40.1	0.49	30.0	0.46	42.6	0.49
Amount owned (in decimal)						
Homestead	2.6	4.8	2.6	4.8	3.4	4.8
Cultivable	1.1	9.7	1.2	11.5	1.4	10.6
Uncultivable	0.2	4.9	0.2	2.7	0.2	1.7
Total	3.9	13.4	4.1	14.2	5.0	13.1
Cultivate others land	1.5	8.2	6.0	17.6	5.1	15.6
Access to land	5.4	16.4	10.1	22.9	10.1	21.1
Land -man ratio	1.1	3.1	1.1	3.6	1.2	2.7
Mortgage, buying and selling (% of households)						
Mortgage in	-	-	9.7	0.30	12.9	0.33
Mortgage out	-	-	1.6	0.12	1.1	0.10
Bought	-	-	5.7	0.23	6.0	0.24
Sold	-	-	2.4	0.15	0.9	0.10
N	**4549**		**4549**		**4549**	

Note: Author's tabulation. Total land comprises homestead, cultivable and uncultivable. Access to land consists of total land plus cultivates other's land. – implies no availability data in 2002.

3.2.3 Food Safety, Income and Health Issues of the Ultra Poor

Rabbani et al. (2006) find the chronic or occasional food deficit is the key characteristics of the ultra poor in Bangladesh. In 2002, over 50% and 40% of the ultra poor households suffer from chronic and occasional food deficit respectively. Only a few households had neither food deficit nor surpluses (break-even) and less than 1% had the food surpluses in 2002. Table 3.c shows dramatic fall in chronic food deficit in 2005, but slightly increases in 2008. However, the extent of occasional food deficit keeps rising over the years, which is evidenced by the acute employment crisis for day labourer in the sample districts in October and November every year (ibid). Improvement in break-even and surpluses are evidenced here.

Table 3.c- Dynamics of Food Safety, Income and Health Issues

Variables	2002		2005		2008	
	Mean	SD	Mean	SD	Mean	SD
Self-Perceived Food Security(% of Households)						
Chronic food deficit	51.5	0.50	22.2	0.42	26.0	0.43
Occasional food deficit	42.6	0.43	53.4	0.50	56.8	0.50
Break-even	5.2	0.22	19.3	0.40	15.1	0.36
Surplus	0.72	0.08	5.06	0.22	2.22	0.15
Income (in Taka at 2002 constant price)*						
Per capita income	2640	2113	3951	2445	6717	3996
Per Capital income and Its Distribution by Quintile (in BDT)*						
Quintile 1	1248	448	1360	489	1165	593
Quintile 2	2439	319	2501	306	2532	309
Quintile 3	3545	344	3588	359	3662	347
Quintile 4	5059	568	5139	587	5298	602
Quintile 5	9702	5947	8856	2680	9899	3945
Health Issues						
Sickness (% of people from last 15 days recall)	14.4	0.35	16.1	0.37	13.0	0.34
Sickness of household head (% of households from last 15 days recall)	16.6	0.37	20.0	0.40	17.0	0.38
Severe illness in last 1 year (% of households)	24.7	0.43	17.2	0.38	13.8	0.34
Prevalence of disability (% of people)	1.9	0.14	1.8	0.13	2.1	0.14
No of Ill member	1.3	0.60	1.3	0.66	1.3	0.66
Proportion who stopped work+	22.4	0.42	39.1	0.49	40.0	0.48
No of days suffered (last 15 days)+	2.4	3.4	5.4	4.2	6.3	4.2
Work days lost (15-days recall)+	3.0	32.1	3.8	18.1	6.1	6.0
Proportion who spent on doctor/med.+	70.3	0.46	81.3	0.39	86.9	0.34
Proportion who spent for transport+	14.0	0.35	14.03	0.35	20.4	0.40
Doctor's fee plus medicine (Taka)+	75	473	115	362	151	542
Transportation cost (Taka)+	5.8	56.5	4.3	28.1	11.7	175
Drink tube well water	97.6	0.15	99.3	0.08	95.4	0.21
Use sanitary latrine	3.3	17.9	60.0	0.49	63.4	0.48

Note: + implies households those reported illness only. * implies 1 USD= 57.8 BDT in 2002.

Findings show a clear upward trend for per capita income. However, this study finds no consistent estimates on the distribution of income as it finds lower per capita income in 2008 than in 2005 for quintile 1. Whereas per capita income increases very slowly for quintile 2 and 3, there is a clear upward trend for the richest two quintiles. As illness depletes human capital and inability to work depletes assets further, it is thus important to look at health related issues. The prevalence of sickness (from last 15-days recall) shows that 14.4% of people suffer from illness in 2002. This rises to 16.1% in 2005 and decreases to 13% in 2008. Thus, less morbidity is found in 2008 compared to 2002. The same evidence is found for severe illness. Disability prevalence is higher among

the ultra poor in Bangladesh and this is supported by our findings that about 2% of the ultra poor are disabled. Proportion of households stopping work has an increasing trend over the years. This study finds people ill for shorter time period lose, on average, 3 working days in 2002, which rose to 3.8 and 6.1 in 2005 and 2008 respectively. This lends support to the hypothesis that increase in number of work days lost reflect the greater ability of the ultra poor to take time off to recover rather than attempt to keep working (Rabbani et al., 2006). Increasing trend in doctor's fee and medicine cost implies larger invest in health and also greater coping ability of the ultra. A large improvement is found for the usage of sanitation.

3.2.4 Coping Ability

This study uses the term 'coping ability' referring to the power or capacity of the ultra poor to recover from crises. As CFPR aims to strengthen capability of the ultra poor, this study measures impact of the CFPR on coping ability, which uses two proxies to measure: one is the amount of money spent for crisis and the other, time to recover. The higher the amount spent for crisis, the higher the coping ability. On the contrary, the shorter the time requires recovering from crisis, the higher the capability of the ultra poor. This study assumes positive association between coping ability and the amount spent for crisis and negative association of time to recover and coping ability. Quisumbing (2011) defines shocks as adverse events that lead to households' income loss, consumption reduction, a loss of productive assets and well-being. Data used in this study are based on a household-level 'shocks' during the time covered in this study, which considers economic, political/social/legal, crime, health and life-cycle shocks. This study considers shocks as crises events because high costs for recovery, which fall them into the trap of poverty. The prevalence of shocks at the ultra poor household-level are summarised in table A.1, which shows the most frequently reported shock is house damages (40.2%), food related problem (52.6%) and severe illness (24.7%) in 2002. However, all these show downward trends implying greater well-being and less shock burden on ultra poor in later years. Among others, high expenses for ceremonies, death of earning or non-earning member, death of livestock, conflict of legal cases, and theft or robbery are the frequent shocks reported by them.

3.4.1 Expenses: Behind the Shocks

In 2005, questionnaire was modified on specific issues in order to include illness and death related shocks of dairy and poultry and also death of an earning and non-earning member. In addition, amount of expenses associated with crisis was collected in 2005 and 2008. Data on time to recover from crisis was collected only in 2005 for observing the coping ability.

Table 3.d- Mean Expense for Crisis

Shock Variables	2005		2008	
	Mean	SD	Mean	SD
Costs incurred due to shocks (in Taka)				
House severely damaged	960	1,309	1,613	2,624
Severely illness	1,622	2,817	2,875	5,734
Food problem	49	47	-	-
Ceremonies	10,191	8,917	17,867	24,812
Livestock disease	204	1,004	312	544
Livestock died	144	188	72	242
Poultry disease	20	32	24	47
Poultry died	15	14	5	60
Conflict/dispute of legal case	4,778	4,906	4,365	7,963
Theft/robbery	616	751	2	7
Earning member died	4,189	11,095	5,194	5,619
Non-earning member died	1,472	1,843	5,000	10,509
Total expenses	2,233	5,097	4,208	11,958

Note: Figures consider only those spent money for such shock.

Table 3.d represents average expenses associated with shocks. The average expense incurred for shock is TK. 2,233 in 2005 and TK. 4,208 in 2008. Among the reported shocks, the highest average expense is found for ceremonies like getting married, which is TK. 10,191. This is due to the higher charge of dowry or other related expenses. The second and third largest expense categories are death of earning member and conflict of legal cases.

3.4.2 Time to Recover from Shock

Recovery from shock within the short time implies the higher coping capability of the ultra poor. In order to measure the coping ability, BRAC-RED collected information by modifying questionnaire in 2005. Self-reported time to recover from crisis is used in this study for analysis. While the three shocks such as ceremonies, conflict or legal case and death of livestock take the highest time to recover from crisis, the lowest time for recovery is found for food crisis. All are summarised in table A.2.

Chapter 4 Model Specification for Impact of the CFPR Program

CFPR impact on landholdings, health and income are measured comparing the outcomes for the treatment with control group, who were surveyed in 2002 for the purpose of impact assessment. This paper uses those groups to find the impact on specific outcomes like landholdings, health and income. This is why this paper does not use propensity score matching (PSM), which is used to construct an artificial group. This study strongly assumes the validity of parallel trend assumption such that our estimates are unbiased and consistent. This chapter describes the design for measuring impact of the CFPR on some specific outcomes using: (i) unconditional difference-in-differences (DID), (ii) conditional difference-in-differences (DID) and (iii) fixed effects method (FEM).

4.1. Modeling Outcome of the CFPR Using Unconditional Difference-in-Differences

Difference-in-differences (DID) method is a central component of any rigorous impact evaluation. A central feature of any impact evaluation is the use of longitudinal data to use DID methods, which rely on baseline(before) and the follow-up (after) data collected from households or members belong to the program (with) and those do not belong to the program (without). In order to separate the program impact, thus we require both before and after & with and without data. CFPR fulfills all requirements for the implementation of double-difference methods in order to get true impact of the CFPR. To see how double-differences work, a modified version of Maluccio and Flores (2005) is shown in table 4.a, where estimator DID is defined as the difference in average outcome in the treatment group before and after the treatment minus the difference in average outcome in the control group before and after treatment. Literally, it is called 'difference of differences' and usually expressed in a tabular form shown in table 4.a, where $\hat{\delta}_{DD}$ measures the true average impact of the CFPR.

We wish to measure impact of the CFPR on an outcome Y over a population of households. There are two groups indexed by treatment status $cfpr = 0,1$ where 0 indicates households who do not receive treatment, i.e. the control group (NSUP), and 1 indicates those who do receive treatment, i.e. the treatment group (SUP). Assume we observe individuals or households in two time periods, $t = 0,1$ where 0 indicates a time period before the SUP receives treatment, i.e. pre-treatment, and 1 indicates post-treatment. Every observation is indexed by the letter $i = 1,2,---------,N;$ individuals or households will typically have two observations each, one pre-treatment and one post-treatment. Let $\bar{Y}_0^T$ and $\bar{Y}_1^T$ be the sample outcome averages of the treatment before and after the treatment respectively and let $\bar{Y}_0^C$ and $\bar{Y}_1^C$ be the

corresponding sample outcome averages of the control. Thus the subscripts correspond to time and superscripts to the treatment status.

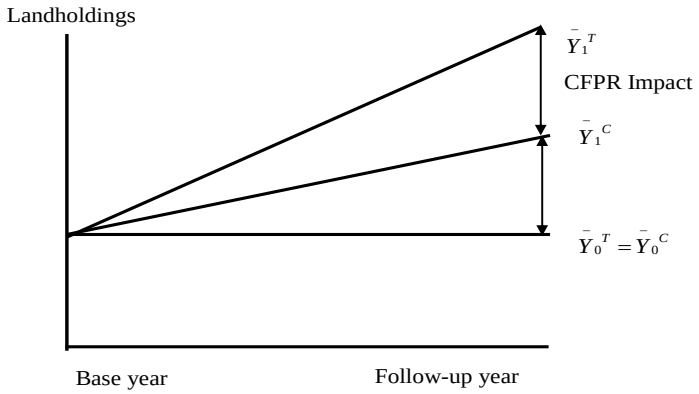
Table 4.a- Difference- in-Differences (DID) Estimator

Group	Before	After	After-Before Difference
Treatment (T)	$\bar{Y}_0^T$	$\bar{Y}_1^T$	$\bar{Y}_1^T - \bar{Y}_0^T$
Control (C)	$\bar{Y}_0^C$	$\bar{Y}_1^C$	$\bar{Y}_1^C - \bar{Y}_0^C$
$T-C$	$\bar{Y}_0^T - \bar{Y}_0^C$	$\bar{Y}_1^T - \bar{Y}_1^C$	$\hat{\delta}_{DD} = \bar{Y}_1^T - \bar{Y}_1^C - (\bar{Y}_0^T - \bar{Y}_0^C)$

Source: Modified from Maluccio and Flores (2005)

Double-difference method can be explained more comprehensibly using graphical illustration. For simplicity, we can assume that both treatment and control group of the CFPR have the same average amount of owned land in the base year ($\bar{Y}_0^T = \bar{Y}_0^C$). If no change in the average outcome of land is assumed over time, this leads to both groups move parallel to the horizontal axis at ($\bar{Y}_0^T = \bar{Y}_0^C$). Here we would have the CFPR impact $\hat{\delta}_{DD} = 0$ as $(\bar{Y}_1^T - \bar{Y}_1^C) = (\bar{Y}_0^T - \bar{Y}_0^C)$. Now we assume that after introducing CFPR, treatment moves along the CFPR intervention line and reach to $\bar{Y}_1^T$ in the follow up year and the control group to $\bar{Y}_1^C$. If only the treatment group was followed, only would naively calculate the CFPR impact as $\bar{Y}_1^T - \bar{Y}_0^T$. However, we see that the average land of the control group moves upward and it has also a clear trend over time, which leads to an improvement of $\bar{Y}_1^C - \bar{Y}_0^C$. Ignorance of this amount leads to the overestimation of the CFPR impact on landholdings. If the trend for the control group were downward, ignoring that effect would tend to underestimate the CFPR impact on landholdings. The correct estimate for the CFPR impact on average landholding is $\bar{Y}_1^T - \bar{Y}_1^C$. This is shown in figure 5.

Figure 5- Illustration of Double-Difference Estimate



The outcome Y_i is modeled by the Ordinary Least Square (OLS) regression:

$$Y_i = \alpha + \beta cfpr_i + \gamma t_i + \delta(cfpr_i * t_i) + \varepsilon_i \text{ ----------(i)}$$

Where, the coefficients indicated by the Greek letters $\alpha, \beta, \gamma, \delta$ are all unknown parameters and ε_i, the random, unobserved 'error' term which contains all determinants of Y_i, which this model omits. The coefficients express the following interpretations:

α = Constant term

β = Treatment group specific effect (to account for average permanent differences between treatment and control

γ = Time trend common to treatment and control

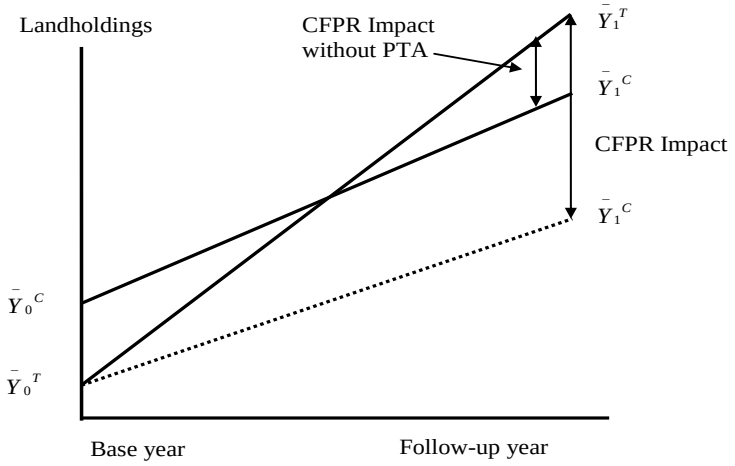
δ = True impact of CFPR

This study purposes to find a 'good' estimate of δ, $\hat{\delta}_{DD}$, given the availability of the data. An assumption for an unbiased estimator is that 'on average' the estimate will be correct, i.e., $E\left[\hat{\delta}_{DD}\right] = \delta$. For correct DID estimator, the assumptions made in this study include the model is correctly specified, $E[\varepsilon_i] = 0$, $\text{cov}(\varepsilon_i, cfpr_i) = 0$, $\text{cov}(\varepsilon_i, t_i) = 0$, and $\text{cov}(\varepsilon_i, cfpr_i * t_i) = 0$. Violation of any assumption gives no guarantee that the estimator, $\hat{\delta}_{DD}$, is unbiased. Unfortunately, it is often difficult and sometimes impossible to check assumptions as they are made about unobservable quantities. However, small deviations from assumptions may not matter as biases are a matter of degree. Here, we need to explore the last assumption, also known as 'parallel-trend assumption', which is the most critical for any impact evaluation using DID. One of the most common problems with DID estimate is the failure of the parallel-trend assumption. If $\text{cov}(\varepsilon_i, cfpr_i * t_i) = \text{cov}(\varepsilon_i, (cfpr_i * t_i)) = \Delta$, then output Y_i follows a different trend for the treatment and control group.

In this case, DID estimator will be biased as $E\left[\hat{\delta}_{DD}\right] = \delta + \Delta$. The failure of parallel trend assumption may in fact be a relatively common problem in many program evaluation studies, causing many DID estimators biased. The way to avoid these problems is to get more data on other time periods before and after treatment and to find other control groups which can provide additional underlying trend.

This study assumes all assumptions are valid for the CFPR impact assessment to guarantee $\hat{\delta}_{DD}$ is unbiased. The validity of the parallel trend assumption holds for this study as all sample households are chronically poor and lie in the same group in our national survey. This is also judged from the perspectives of ultra-poverty transitions and dynamics in Bangladesh, which can be found in Quisumbing (2011). How does parallel trend assumption work in this study shown in figure 6. Otherwise, estimates would suffer from the problem of under-estimation. The dotted line in figure 6 shows the treatment group would move parallel to the control group in absence of the CFPR.

Figure 6- Illustration of Parallel Trend Assumption of the CFPR



4.2 Modeling Outcome of the CFPR Using Conditional Difference-in-Differences

The CFPR outcome modelled in (ii) is same as in (i), but now it adds covariates, x_i.

$$Y_i = \alpha + \beta cfpr_i + \gamma t_i + \delta(cfpr_i * t_i) + \varphi x_i + \varepsilon_i \text{ ----------} (ii)$$

When x_i are added to control, populations sampled may differ systematically over the periods. OLS estimator, $\hat{\delta}$, is no longer has the form shown in table 4.a., but its interpretation remains same. Here, one additional assumption $\text{cov}(x_i, \varepsilon_i) = 0$ is required. This study controls the household

characteristics to measure true impact of the CFPR. Then check for robustness is done comparing the impact estimates found in (i) & (ii).

4.3 The Fixed Effects Model (FEM): Theoretical Aspect

Fixed effects estimates are at least as common as first differencing. For measuring impact of the CFPR on landholdings and income, we start from:

$$Y_{it} = \alpha_0 + \alpha_1 t_{2005} + \alpha_2 t_{2008} + \sum_k \phi_k x_i + \delta_1 (cfpr_i * t_{2005}) + \delta_1 (cfpr_i * t_{2008}) + \varphi_i + \varepsilon_{it} \quad ---(iii)$$

Which is a regression of the amount of landholdings or income for household i in time-period t against the household fixed effects (φ_i), a series of household socio-demographic characteristics, time dummies, interaction dummies between $cfpr$ and time dummies and a random error term (ε_{it}). Socio-demographic controls include age, sex, marital status, literacy and education of the household head, household size, no of earning member and savings. The program dummy $cfpr$ takes value 1 if household belongs to the CFPR, 0 if otherwise. The household fixed effect captures all time-invariant household-specific unobserved heterogeneity such as preferences, health endowments, ability and intelligence that may affect outcome like land and income. Time dummies capture the outcome variation in period t and remain common to all households. The interactions $(cfpr * t)$ give the short- and long-term impact on landholdings or income. The error terms represent random variation. As we allow the unobserved fixed effects, φ_i are correlated with explanatory variables in (iii), it is measured by the FEM assuming $Cov(\Delta xi, \Delta\varepsilon_i) = 0$, which implies that explanatory variables are strictly exogenous and thus the FE estimator is unbiased. Here, OLS produces unbiased and efficient estimates and these would be called causal if $\text{cov}(\Delta x_i, \Delta\varepsilon_i) = 0$. However, this qualification fails if the explanatory variables do not change over time for any cross-sectional observation. As we are concerned with household characteristics, it is better to apply FEM rather than REM.

Chapter 5 Result and Discussion

BRAC-CFPR provides inputs to the selected beneficiaries for better livelihoods. The overall impact of the CFPR is divided into six categories: increase in assets and its return, consumption smoothing, decrease in morbidity and vulnerability, increase in awareness and coping ability. The CFPR is directly linked to all outputs except coping ability, which is considered here as mixture of direct and indirect impact of the program. Direct output comes straightway from the functioning of inputs and indirect output is generated from 'capability to functioning' of those output together. The sum of direct and mix-output comprises overall impact. This study focuses impact on landholdings, health and income as these three are the vital for their livelihoods. In addition, this study focuses to what extent CFPR enhances coping ability of the ultra poor. In section 5.1, we present impact on landholdings, health and income using unconditional DID. Section 5.2 focuses on same issues using conditional DID. A special focus on coping ability is given in section 5.3; fixed effects estimation on landholdings, access to land, chronic food deficit, per capita income and its distribution is conducted in section 5.4 and finally, comparisons of those estimates are discussed in section 5.5 to check for robustness.

5.1 Impact Estimation of the CFPR Using Unconditional Difference-in-Differences

5.1.1 Impact on Landholdings

This study uses two measurement units: proportion of households and decimal for observing the impact on landholdings. We first apply the first-difference method between the treatment and control group for each year in order to see whether any significant differences exist. Estimates from first-difference are summarized in table A.3. We find the significant differences in all types of landholdings using proportion as a unit of measurement in 2002. We get similar results after using decimal as a unit of measurement except for uncultivable land. Negative sign in the first-difference estimates implies the proportion of households owning land is higher for the control group than that of treatment. Similarly, we have computed the first-difference estimates for 2005 and 2008 respectively. Finally, we have estimated impact of the CFPR on landholdings on which we are concerned with.

Table 5.a- Impact on Landholdings Using Unconditional DID

Landholdings	CFPR Impact+		
	2005 over 2002	2008 over 2002	2008 over 2005
Landholdings (% of households)			
Homestead	7.1***	12.7***	5.6***
Cultivable	2.6***	5.2***	2.7***
Uncultivable	0.3	0.5	0.3
Total	7.6***	13.5***	5.8***
Cultivate others	8.9***	14.3***	5.4***
Access to land	12.6***	17.5***	4.9**
Access for leasing	19.3***	18.8***	-0.6
Amount of land (in decimal)[10]			
Homestead owned	0.7***	1.0***	0.3
Cultivable owned	0.4	1.0**	0.6
Uncultivable owned	0.0	0.1	0.06
Total owned	1.1**	2.2***	1.0*
Cultivate others	1.0*	3.0***	2.0***
Access to land	2.2***	5.2***	3.0***
Land -man ratio	0.4***	0.7***	0.3**
Mortgage, buying and selling (% of households)			
Mortgage in	-	-	7.2***
Mortgage out	-	-	0.2
Bought	-	-	2.1**
Sold	-	-	1.7***

Note: + positive sign implies ownership is higher for treatment than the control. Short-term impact (2008 over 2005) is the difference between long-term minus short-term (2005 over 2002). ***p<0.01, **p<0.05 and *p<0.1. – implies unavailability of data in 2002.

True impact of the CFPR on landholdings is done using unconditional DID. However, all estimates of unconditional DID are based on this specification. The exact specification of impact measurement follows:

$$Y_i = \alpha_1 t_{2002} + \alpha_2 t_{2005} + \alpha_3 t_{2008} + \beta cfpr + \delta_1 cfpr * t_{2005} + \delta_2 cfpr * t_{2008} + \varepsilon_i - (iv)$$

In (iv), time dummies t_{2002}, t_{2005} *and* t_{2008} give mean outcomes for control in each period, program dummy $cfpr$ give single difference estimate for base period and interactions $cfpr * t_{2005}$ *and* $cfpr * t_{2008}$ dummies give DID or impact estimates for 2005 and 2008 over 2002 respectively. Thus the coefficients on interactions, δ_1 *and* δ_2, give the true impact of the program.

[10] Decimal, though outdated, is still used in rural part of Bangladesh. 1 decimal is equal to 40.46 square meters.

This study follows the similar specification for measuring true CFPR impact in 2008 over 2005, where we drop 2002 year dummy and the program interaction dummy with 2005. Unconditional DID using proportion of household shows the significant true impact on landholdings in 2005 and 2008 over 2002 except for uncultivable land. Similarly, we find significant true impact in 2008 over 2005 except for uncultivable land and land leasing. This additional impact provides insights that short-term impact (2005 over 2002) is higher than long-term impact, but difference is no more significant on leasing in 2008 over 2005. However, all other cases, long-term impact is higher than short-term (2005 over 2002).

Unconditional DID using decimal shows the significant positive impact on homestead, total land, cultivate others land, access to land and land-man ratio in 2005 over 2002. However, we find the significant impact on all categories except uncultivable land in the long-run. Impact on cultivable land contradicts with the previous one as we change measurement unit. Thus, CFPR has significant positive impact on cultivable landholdings in the long-run. These findings are consistent with rational hypothesis that the people generally spends on a durable items after the increase in income becomes permanent. Impacts in 2008 over 2005 show that CFPR has the significant impacts on total land, cultivate others lands, access to land and land-man ratio and all these are positive.

This study measures only the short-term (2008 over 2005) impact as data regarding mortgage in and out, bought and sold land were not collected in 2002. Findings show the significant impact of CFPR on mortgage in, buying and selling land. Higher proportion of households of the treatment group is getting involved in mortgage in. In case of buying lands, proportion of households within the treatment group increases over the years while this declines for the control. Thus, the impact is high and significant. This implies that 2.1% of the households buy lands more due to the CFPR program as we compare it to the control. As selling land or distressed sale is linked to shock, findings suggest that proportion of households selling land is higher for the control than the treatment group in 2005. The first difference is statistically significant and negative. But no significant difference is found between the groups in 2008. This is why true impact of the CFPR is positive. This rationale interested me to look at the impact on coping ability of the ultra poor.

5.1.2 Impact on Food Safety, Income and Its Distribution

The concept 'food security' refers to whether households face any chronic and occasional food deficit, beak-even and surpluses. This study uses per capita income at 2002 constant prices to have the impact in real term. The estimates from first-difference are shown table A.4, which shows the higher prevalence of chronic food deficit in the treatment (61.8%) than the control group (41.3%) in 2002. However, occasional food deficit is lower for the treatment (35.8%) than the control (49.3%) in 2002. In terms of break-even and surplus, control group is better off than the treatment. Though acute food shortages are more prevalent in the treatment in 2002, they become better off in follow up year. The findings of first-differences can be found in table A.4.

Impact on food security, income and its distribution are shown in table 5.b, which shows CFPR has significant impact on reducing the chronic food deficit faced by the treatment in 2005 and 2008 over 2002. But occasional food deficit significantly increases during the same periods, which is neglected in most of the existing studies that have assessed CFPR impact. For break-even and surpluses, we find significant positive impact on control group both in short-run (2005 over 2002) and long-run. Negative sign in 2008 over 2005 implies long-run impact is smaller than short-run. Overall, CFPR plays a crucial role bringing food security to them though it contributes to occasional food deficit. Significant true impact of the CFPR on food security is found only for break-even in 2008 over 2005, which is negative.

Table 5.b- Impact on Food Safety, Income and Its Distribution Using Unconditional DID

Variables	CFPR Impact		
	2005 Over 2002	2008 over 2002	2008 over 2005
Self-Perceived Food Security(% of Households)			
Chronic food deficit	-35.5***	-33.1***	2.5
Occasional food deficit	13.5***	16.6***	3.1
Break-even	16.8***	12.5***	-4.4***
Surplus	5.2***	4.0***	-1.2
Income (in Taka)			
Per capita Income	969***	1,802***	832***
Income Sub-Groups by Quintile (in Taka)			
Quintile 1	107***	227**	119
Quintile 2	3.0	3.0	0.02
Quintile 3	-17	12	30
Quintile 4	77	161**	84*
Quintile 5	1,195	1,996**	801***

***p<0.01, **p<0.05 and *p<0.1

Table A.4 shows the significant differences in income between the groups in 2002, where negative sign implies higher income for control than the treatment. However, we find opposite results in 2005 and 2008. But we do not find any significant differences in income between the groups for all quintiles in 2002. However, first-difference estimates become significant in 2008 except for quintile 2. Impact on income and its distribution by quintile is measured to observe both short- and long-term impact of the CFPR. It helps to see whether CFPR's impact on income is evenly distributed among the beneficiaries as it is evidenced from literature review that ultra poor are heterogeneous assemblages of different people experiencing multiplicity of deprivations. This is essential for reshaping and exploring the existing policies for the ultra poor. Unconditional DID estimates for per capita income show the true positive impact in both short-terms and long-term. The findings from DID on each quintile are very impressive as we find the significant impact for the lowest quintile in 2005 over 2002 and long-term impact for the poorest

and the riches two quintiles. Short-term significant impact in 2008 over 2005 is found only for the richest quintile at 5% level of significance. No significant impact of the CFPR is found for quintile 2 and 3. Thus, benefit accrued from CFPR is not evenly distributed among the beneficiaries. However, all signs on impact coefficients are positive except one in the short-tern for quintile 3. Overall, we could see the role of CFPR for increasing income of the ultra poor.

5.1.3 Impact on Health Issues

This study focuses to what extent CFPR contributes to health related issues. Recall method for last 15 days was used to see the prevalence of sickness in the ultra poor people More than 14 percent of them suffer from at least one kind of sicknesses. The sickness prevalence for the two groups is measured using first-difference shown in table A.5. This study finds no significant impact of the program on morbidity issues. However, it finds the significant long-term impact for stop working due to illness though average work days lost is no longer significant. This implies more ability of the treatment group in 2008. We also find the treatment group invests, on average, more in health compared to the control, which are evidenced from our estimates that the higher proportion of people of the treatment group spends on doctor's fee and medicine and transportation. It is also evidenced from the amount they spend for health. The CFPR has wider impact on usage of sanitation though we have the negative impact in 2008 over 2005, which means long-term impact is smaller than the short-term. This raises the question of sustainability.

Table 5.c- Impact on Health Issues Using Unconditional DID

Variables	CFPR Impact		
	2005 over 2002	2008 over 2002	2008 over 2005
Sickness from last 15 days recall			
Sickness (% of people)	-1.1	-0.7	0.3
Sickness of HHH (% of HHs)	2.9	2.2	-0.7
Severe illness (% HHs) last 1 year	-0.3	1.5	1.8
Disability (% of ultra poor people)	-0.1	0.2	0.3
No of sick member	-0.03	-0.01	0.03
Stopped working (%)+	1.3	6.2***	4.8
Days suffered	-0.1	0.4**	0.6**
Work days lost+	-0.8	-1.3	-0.5
Proportion spent on doctor/med.+	6.1***	7.7***	1.6
Proportion spent for transport+	6.2***	6.2***	-0.1
Fee plus medicine cost(Taka)+	66***	121***	55**
Transportation cost (Taka)+	7.1***	0.3	-6.9
Drink tube well water (% HH)	0.4	-0.1	-0.6***
Use sanitary latrine (% HH)	36.3***	17.3***	-19.1***

Note: + households only those reported sickness. ***p<0.01 and **p<0.05.

5.2 Impact Estimation of the CFPR Using Conditional Difference-in-Differences

5.2.1 Impact on Landholdings

The impact of the CFPR on landholdings is measured using conditional difference-in-differences estimate, which is almost same as unconditional. Conditional DID measures the impact after controlling the covariates of the household characteristics like size of the household, age, sex, marital status, education, literacy of the household head, no of earning member and savings. This study uses the following specification for measuring true impact of the program for short-and long-term (2005 over 2002 & 2008 over 2002), shown in table 5.d.

$$Y_i = \alpha_1 t_{2002} + \alpha_2 t_{2005} + \alpha_3 t_{2008} + \beta cfpr + \delta_1 cfpr * t_{2005} + \delta_2 cfpr * t_{2008} + \varphi_1 hh\_size + \varphi_2 age\_hhh + \varphi_3 sex\_hhh + \varphi_4 married + \varphi_5 edu\_hhh + \varphi_6 lit\_hhh + \varphi_7 earn\_mem + \varphi_8 savings + \varepsilon_i \quad -----(v)$$

Table 5.d- Impact on Landholdings Using Conditional DID

Outcome variables	CFPR Impacts+		
	2005 over 2002	2008 over 2002	2008 over 2005
Landholdings (% of Households)			
Homestead	1.7	7.5***	5.9***
Cultivable	0.2	2.8***	2.6***
Uncultivable	-0.4	-0.1	0.3
Total	1.6	7.6***	6.1***
Cultivate others	3.8**	9.2***	5.4***
Access to land	5.4**	10.5***	5.2***
Access for leasing	9.1***	8.4***	-0.7
Amount owned (in decimal)			
Homestead	0.09	0.38*	0.30
Cultivable	-0.03	0.61	0.65
Uncultivable	0.03	0.09	0.06
Total	0.09	1.09*	1.01*
Cultivate others	-1.06	0.93	2.01***
Access to land	-0.97	2.02***	3.03***
Land -man ratio	0.11	0.40***	0.29**
Mortgage, buying and selling (% of households)			
Mortgage in			7.32***
Mortgage out			0.10
Bought			2.00**
Sold			1.86***

Note: +In all conditional DID estimates, this study controls for size of the household, age, sex, marital status, education, literacy of the household head, no of earning member and savings. Significance is based on robust standard errors. ***p<0.01, **p<0.05 and *p<0.1.

After controlling the household characteristics, we find no significant impact using proportion of households on homestead, cultivable and uncultivable land in 2005 over 2002. However, we find the significant impact on cultivation of others land, access to land and leasing. Thus, CFPR enhances access to land and leasing. However, long-term impact is significant for all cases except uncultivable land. The short-term impact for 2008 over 2005 is similar to long-term except for leasing. The drastic increase in leasing was held between 2002 and 2005. This study finds no significant short-term (2005 over 2002) impact using decimal as unit of measurement. However, we find significant short-term impact on total land, cultivate others land, access to land and land-man ratio in 2008 over 2005 and long-term impact on homestead, total land, access to land and land-man ratio. Thus, findings here are imperatives for the treatment group in a sense that long-term impact is higher for the short-term (2005 over 2002) and we, therefore, conclude it takes time for the treatment group to have true impact of CFPR on landholdings.

5.2.2 Impact on Food Safety, Income and Its Distribution

True impact of the CFPR on food security, per capita income and its distribution by quintile is estimated using conditional DID after controlling the household characteristics. It shows the significant impact on chronic food deficit in 2005 and 2008 over 2002. Negative sign implies that households belonging to CFPR face less chronic food deficit. However, we do not find significant impact in 2008 over 2005. This study finds the opposite result for occasional food deficit. For break-even and surpluses, there is significant impact on food security. Table 5.e shows the significant impact on income after controlling the household characteristics. However, this study provides very intuitive findings after using the quintile approach as it finds no significant impact on any quintile in 2005 over 2002. Significant impact for the upper two quintiles is found in 2008 over 2002 &2005.

Table 5.e- Impact on Food Safety, income and Its Distribution Using Conditional DID

Outcome variables	CFPR Impacts		
	2005 over 2002	2008 over 2002	2008 over 2005
Self-Perceived Food Security(% of Households)			
Chronic food deficit	-22.5***	-20.1***	2.5
Occasional food deficit	9.5***	12.8***	3.3
Break-even	10.2***	6.0***	-4.3***
Surplus	2.7***	1.3**	-1.4*
Income			
Per capita Income	339***	1190***	850***
Income Sub-groups by Per Capita Income Quintile			
Quintile 1	69	148	77
Quintile 2	-18	-20	-3
Quintile 3	-7	21	28
Quintile 4	67	175**	106**
Quintile 5	476	1611*	1146***

Note: Significance based on robust standard errors. ***p<0.01, **p<0.05 and *p<0.1

5.2.3 Impact on Health Issues

Unconditional DID estimates on health related issues prove that the CFPR has very little impact on reducing the illness. However, it has impact on investment in health, which will bring benefit in them in the future. To check for robustness, we have estimated conditional DID on some specific issues. We find CFPR has significant impact on reducing severe illness in the short-term. Findings in table 5.f show CFPR has no impact on drinking tube well water, but it has the significant impact on the usage of sanitation both short-and long-term. However, the impact in 2008 over 2005 is negative, which implies long-term impact is smaller than the short-term. Though the magnitudes of the conditional estimates for usage of sanitation are smaller than the estimates from unconditional, the magnitudes, sign and significance remain same for the impact in 2008 over 2005. Therefore, after end of the program, the trend of the impact starts declining. Special focus on the impact of health-crises is also discussed in section on the coping ability.

Table 5.f- Impact on Health Issues Using Conditional DID

Variables	CFPR Impacts		
	2005 over 2002	2008 over 2002	2008 over 2005
Sickness of HHH (% of HHs)	2.5	1.8	-0.7
Severe illness (% HHs) last 1 year	-3.8**	-1.9	2.1
No of sick member	-0.05	-0.01	0.03
Drink tube well water (% HHs)	-0.1	-0.8	-0.7
Use sanitary latrine (% HHs)	32.3***	13.2***	-19.1***

Note: Significance based on robust standard errors. ***p<0.01, **p<0.05

5.3 Impact of the CFPR on Coping Ability

5.3.1 Impact on Coping Ability Measured by Expense to Shock

CFPR impact on coping ability is measured using unconditional DID. Amount of money spent for facing crisis is used as a surrogate for measuring coping ability. The reported figures consider only those households that experienced shock. The more expense implies more capability of the ultra poor and thus, the more impact of the CFPR. Unconditional DID estimates on expense are shown in table 5.g, which shows the significant impact on the coping ability only for two cases, e.g., ceremonies and severe illness. As the CFPR works for enhancing the capability of the ultra poor, thus it is evidenced from our findings that the beneficiary could spend more in the face of crises. More coping ability is also evidenced from high investment in health in case of severe illness. These are shown in table 5.g.

Table 5.g- Impact on Coping Ability Using Unconditional DID

Shocks	2005			2008		CFPR Impact	
	T	C	D_1	T	C	D_2	DID
Expense (in Taka)							
House damage	835	675	159*	1681	1529	53	-8
Severe illness	1434	1728	-294	3284	2455	1101**	1123**
Food shortage	0.09	0.29	0.20	-	-	-	-
Ceremonies	8870	10779	-1909*	19983	15403	5925**	6389**
EM or NEM died	3318	1705	1613	193	203	-1589	-1621
Livestock died	18	8	10	74	67	5	-3
Conflict/dispute	4141	2781	1360	6519	2211	1939	2947
Theft/robbery	178	64	113	2	0	-89	-111
EM died	5233	1523	3710	5161	5264	-4179*	-3813
NEM died	855	1794	-939*	2500	6911	87	-3472
Total expenses	**136**	**61**	**75**	**193**	**203**	**-10**	**-84**

Note: Figures apply to those holds that experienced shock. Significance based on robust standard errors. ***p<0.01, **p<0.05 and *p<0.1.

5.3.2 Coping Ability Measured by Time to Recover

First-difference is used to see whether any significant difference exists between the treatment and control. Earlier recovery from shocks implies higher coping capability of the ultra poor. Positive sign in first-difference implies the beneficiary takes more time to recovery compared to non-beneficiary. This study finds significant difference between the groups for ceremonies, theft or robbery and death of an earning member. Though the sign is negative for ceremonies, it is positive for theft and death of an earning member. Thus, treatment group is more vulnerable to theft and death of an earning member as treatment group takes significantly longer time to recover compared to control. However, negative sign for ceremonies implies that the treatment group needs significantly less time to recover from such shock as compared to the control. We might guess CFPR plays role to coping ability of the ultra poor for house damages, severe illness, conflict and non-earning member's death as the signs are negative for those. Sometimes sign of the coefficients, not the significance, plays important role for policy implication.

Table 5.h- Impact on Coping Ability Using Single-Difference

Shocks	Mean Values (in month)		Mean difference
	Treatment	Control	
House severely damaged	0.52	0.57	-0.05
Severe illness	0.87	0.94	-0.07
Food related problem	0.02	0.01	0.01
Ceremonies	1.41	2.25	-0.84***
Livestock disease	0.12	0.11	0.01
Livestock died	1.19	0.92	0.27
Poultry disease	0.05	0.04	0.01
Poultry died	0.28	0.23	0.05
Conflict/dispute of legal case	1.56	1.63	-0.07
Theft/robbery	1.05	0.38	0.67*
Earning member died	1.00	0.29	0.71**
Non-earning member died	0.24	0.36	-0.12

Note: ***p<0.01, **p<0.05 and *p<0.1. Computed for only those reported such crisis.

5.4 Econometric Modelling of Impact of the CFPR

Impact of the CFPR on landholdings, food deficit, income and its distribution by quintile is modelled for the ultra poor households. It shows to what extent CFPR enables ultra poor to smooth impact using fixed effects model (FEM). However, we have estimated both random effects and fixed effects models, but we have reported the findings that best suit with our methodology. The detailed about FEM is discussed in chapter 4. Here we have controlled the household characteristics like as conditional. But FEM is different as it also captures the unobserved heterogeneity and uses the transformation to provide a picture on an average.

5.4.1 Impact of the CFPR on landholdings and Chronic Food Deficit

Findings from FEM for landholdings and chronic food deficit of the ultra poor are reported in table 5.i. Fixed effects estimates are reported in all specifications as it is evidenced from Hausman test. The coefficients of our interest are reported here. The results in column (1) show the CFPR has significant long-term impact on total landholdings and access to land after controlling observed and unobserved household characteristics. Thus, long-term coefficients on CFPR interaction with time dummy 2008 are statistically significant for landholdings and land access.

Land-man ratio specification in column (3) shows the CFPR has both short- and long-term significant impact on land-man ratio at 10% and 1% level of significance respectively. As land plays a crucial role in mitigating food related crisis, higher access to land leads to less food deficit of the ultra poor. This hypothesis is tested to check whether the CFPR has any impact on reducing food insecurity. Chronic food deficit specification is presented in column (4), which shows the significant impact of the program for both short-

and long-term as the coefficients on the CFPR interactions with time dummies are statistically significantly different from zero at 1% level of significance. The negative sign indicates CFPR beneficiaries face less chronic food deficit compared to non-beneficiaries. Explanatory variables those are of our interest are summarised in table 5.i.

Table 5.i- Impact on Landholdings, Land-man Ratio and Chronic Food Deficit Using FEM

Explanatory variables	Outcome variables			
	Total land	**Land Access**	**Land-man ratio**	**Chronic food deficit**
CFPR-TUP*2005	0.593	0.459	0.215*	-0.254***
	(0.440)	(0.790)	(0.124)	(0.021)
CFPR-TUP*2008	1.581***	3.387***	0.504***	-0.227***
	(0.473)	(0.751)	(0.114)	(0.021)
Constant	1.933	-2.037	1.419***	0.400***
	(1.486)	(3.104)	(0.417)	(0.066)
No of observation	**13,569**	**13,569**	**13,569**	**13,569**
Hausman Chi2	**93.62**	**65.71**	**94.58**	**194.31**
Prob>chi2	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Note: Complete findings are reported in table A.6. ***p<0.01, **p<0.05 and *p<0.1.

5.4.2 Impact of the CFPR on Income and Its Distribution

Explanatory variables those are of our interest are presented in table 5.j. The FEM uses two specifications for the dependent variable: per capita income and logarithm of per capita income. We have controlled the household characteristics in both specifications. This study finds the significant positive impact of the CFPR on per capita income both for short- and long-term. The results are reported in column (1). The log-linear form, reported in column (2), do not bring any significant changes in the coefficients of interest. CFPR therefore has positive and significant impact on yearly per capita income irrespective of specifications. Involvement with CFPR significantly increases the household level income Tk. 631 and Tk. 1442 in 2005 & 2008 over 2002 respectively, which are measured at 2002 constant prices using consumer price index (CPI). Per capita income increases by 18.8% (exact 20.68%) and by 22.8% (exact 25.61%) in the short- and long-run respectively only due to the CFPR. Thus the CFPR impact on per capital income is consistent in both specifications.

Table 5.j- Impact of the CFPR on Income using FEM

Explanatory variables	Per capita Income (1)	Log of per capita income[11] (2)
CFPR-TUP*2005	631.22***	0.188***
	(97.36)	(0.027)
CFPR-TUP*2008	1442.08***	0.228***
	(130.45)	(0.028)
Constant	6994.16***	8.606***
	(567.41)	(0.110))
No of observation	**13,543**	**13,509**
Hausman Chi2	**238.19**	**286.11**
Prob>chi2	**0.0000**	**0.0000**

Note: Complete specifications are reported in table A.6 in Appendix. ***p<0.01, **p<0.05 and *p<0.1.

Impact of the CFPR on the distribution of income by quintile is estimated by applying both fixed and random effect models on each distribution and the best suited findings are reported in table A.8. However, explanatory variables of our interest are reported in table 5.k. Findings in column (1) shows CFPR has significant short- and long-term impact on per capita income of those living in quintile 1. From income specification reported in column (2), we find that none of the coefficients of our interest are statistically significantly different from zero. Thus CFPR has no significant impact on per capita income of those living in the poorest second quintile. Even the sign of the coefficients on CFPR interaction dummies are negative, which implies that engagement with CFPR reduces income over time though it is not significant. For middle quintile, the CFPR has long-term impact on income, which is statistically significant at 10% level. We have reported the findings from REM as Prob>chi2=0.1648 and Prob>chi2=0.1684 for quintile 2 and 3 respectively. For the richest two quintiles, fixed effect estimates are reported following the Hausman test. Findings show no true impact of the CFPR on per capita income of those living in the second richest quintile. Fixed effect estimates reported in column (5) show CFPR has both short- and long-term significant impact on income of the households living in the richest quintile. If this study considers at best 5% level of significance, it finds both short- and long-term significant impact on income of those living in the poorest quintile and only long-term impact on those living in the richest quintile. This is evidenced from findings that impact of the CFPR on income of the beneficiaries is not evenly distributed.

[11] In case of log-linear specification, the exact percentage change $= 100 * [\exp(\hat{\beta}) - 1]$.

Table 5.k- Impact of the CFPR on Distribution of Income Using FEM and REM

Explanatory variables	Per capita Income				
	Quintile1	Quintile2	Quintile3	Quintile4	Quintile5
	FEM	REM	REM	FEM	FEM
	(1)	(2)	(3)	(4)	(5)
CFPR-TUP*2005	219.40***	-27.79	24.57	-93.04	2712.33*
	(73.82)	(21.52)	(23.87)	(124.60)	(1529.28)
CFPR-TUP*2008	346.67**	-29.71	54.36*	-31.15	4285.67***
	(147.13)	(37.29)	(28.62)	(137.00)	(1573.86)
No of observation	**2709**	**2761**	**2657**	**2709**	**2707**
Hausman Chi2	**22.19**	**16.61**	**16.52**	**22.81**	**39.88**
Prob>chi2	**0.0354**	**0.1648**	**0.1684**	**0.0294**	**0.0001**

Note: Results are reported from full specification, which is shown in Table A.8. ***p<0.01, **p<0.05 & *p<0.1.

5.5 Robustness of Impact Estimates of the CFPR

This section compares impact estimates for outcomes (from unconditional and conditional DID and fixed effects) like landholdings, self-perceived food security, income and its distribution by quintile in order to check whether these estimates are robust or not. The term 'robust' refers to mean the coincidence of impact estimates in terms of significance from two or more approaches. For this purpose, we have combined the impact estimates in one table so that we can check the consistency and robustness of those estimates. For robustness check, we have considered only one short-term (2005 over 2002) and long-term (2008 over 2002) impact estimates.

5.5.1 Robustness of Impact on Landholdings

Estimated impact of the CFPR from unconditional and conditional DID and FEM on landholdings are reported in table 5.l. From conditional and unconditional DID estimates, this study finds the consistent and significant impact estimates for homestead only in the long-term using proportion of households as a unit of measurement. Though we find significant impact on homestead in the short-term under unconditional DID, but the estimate is no longer significant under conditional DID. This study also finds similar impact on cultivable and total landholdings. Thus our findings are robust for homestead, cultivable and total landholdings only in the long-term. Cultivation of others' land, access to land and leasing show consistency for all estimates both in the short- and long-term. All the estimates are also found significantly different from zero. Thus the estimates from both methods are consistent and robust for cultivation of others' land, access to land and leasing.

Table 5.I- Impact Estimates on Landholdings from DID Unconditional and Conditional and FEM

Landholdings	CFPR Impact					
	Unconditional DID		Conditional DID		FEM	
	2005 over 2002	2008 over 2002	2005 over 2002	2008 over 2002	2005 over 2002	2008 over 2002
Landholdings (% of households)						
Homestead	7.1***	12.7***	1.7	7.5***	-	-
Cultivable	2.6***	5.2***	0.2	2.8***	-	-
Uncultivable	0.3	0.5	-0.4	-0.1	-	-
Total	7.6***	13.5***	1.6	7.6***	-	-
Cultivate others	8.9***	14.3***	3.8**	9.2***	-	-
Access to land	12.6***	17.5***	5.4**	10.5***	-	-
Leasing	19.3***	18.8***	9.1***	8.4***	-	-
Amount of land (in decimal)						
Homestead owned	0.7***	1.0***	0.09	0.38*	-	-
Cultivable owned	0.4	1.0**	-0.03	0.61	-	-
Uncultivable owned	0.0	0.1	0.03	0.09	-	-
Total owned	1.1**	2.2***	0.09	1.09*	0.593	1.58***
Cultivate others	1.0*	3.0***	-1.06	0.93	-	-
Access to land	2.2***	5.2***	-0.97	2.02***	0.459	3.39***
Land -man ratio	0.4***	0.7***	0.11	0.40***	0.215*	0.50***

. ***p<0.01, **p<0.05 and *p<0.1.

Now we check the robustness and consistency of our estimates using amount of land as a unit of measurement. This study finds the significant short- and long-term impact on homestead under unconditional DID, but we find the significant impact only in the long-term after controlling the household characteristics. Thus the estimated impact on homestead is robust only in the long-term at 10% level of significance. Though this study finds significant impact on cultivable land in the long-term under unconditional DID, but no estimates are found significant under conditional DID. Thus it finds no robust estimates for cultivable land. Though we find significant short- and long-term impact on total landholdings under unconditional DID, but we find the significant impact only in the long-term under conditional DID. This study therefore finds the robust impact on total landholdings only in the long-term at 10% level of significance. In addition to check for robustness, we have applied the FEM to estimate the impact of the program on total land owned. Fixed effect estimator is found significant only in the long-run for total landholdings. Thus all three approaches of impact estimation prove the robustness of our findings on total landholdings. Though the estimates on cultivation of others' land are significant under unconditional DDI, we find no significant impact of the CFPR on it. Thus no robust estimates are found for cultivation of others' land. Though we find significant short- and long-term

impact on access to land under unconditional DID, but we find the significant impact only in the long-term under conditional DID. This study therefore finds the robust impact on access to land only in the long-term at 1% level of significance. We have also applied FEM to estimate the impact on access to land. Fixed effect estimator is found significant only in the long-run. Thus the CFPR has robust impact on total land and access to land in the long-run as it is evidenced from the irrespective of approaches. We find both short- and long-term significant and positive impact on land-man ratio under unconditional DID and FEM approaches, but only long-term significant impact is found under conditional DID. Thus the common long-term impact under three approaches is found for land-man ratio. The impact on land-man ratio is therefore robust in the long-run.

5.5.2 Robustness of Impact on Self-Perceived Food Security, Income and Its Distribution

Impact estimates of the CFPR on self-perceived food security, income and its distribution from unconditional and conditional DID and FEM are reported in table 5.m. Impact on chronic food deficit in terms of the proportion of households shows the significant and consistent estimates in both short- and long-term under the three approaches. Thus we find the robust impact of the CFPR on chronic food deficit. The negative sign implies that households belong to the CFPR face significantly less chronic food deficit compared to the control group. Thus the CFPR contributes to chronic food security for the treatment group. For other three categories, we have applied unconditional and conditional DID estimate to check for the robustness of estimates. We find the significant, consistent and positive impact of the CFPR for occasional, break-even and surpluses. Though the magnitudes are smaller under conditional DID, however coefficients remain highly significant for all three categories. This study finds though the CFPR contributes to chronic food security, it accelerates the occasional food insecurity as the sign is positive. However, we do not find any significant impact on this category in 2008 over 2005. For beak-even and surpluses, the estimates are consistent, positive and significant and thus the robust estimates.

As we are also interested to check robustness of the impact estimates on income and its distribution by quintile, we have produced impact estimates applying the three methods of estimation. It should be mentioned here that we have reported REM estimates for quintile 2 and 3 as it justified by Hausman test. Findings show that impact on per capita income remains consistent and significant irrespective of approaches used. Thus the impact estimates found in this study for per capita income is robust. However, this contradicts when we use quintile approach to measure the impact. This study find the significant short-and long-term impact for those living in the poorest quintile under unconditional DID. But after imposition of covariates in the regression, no coefficients remain significant even at 10% level of significance though the coefficients are significant both in short- and long-run under FEM. Thus this study finds no robust estimates for income of those in quintile 1. Under three approaches, this study finds no significant impact estimates on income of

those living in quintile 2 and 3. These findings are also supported by FEM. Here we find the consistent but not robust impact estimates for quintile 2 and 3. Both conditional and unconditional DID find the long-term significant impact on income of those in quintile 4. But FEM does not provide any significant impact for quintile 4. Quintile 5 shows that per capita income remains consistent and significant irrespective of approaches only in the long-run. Thus the impact estimates found in this study for distribution of income is robust only for those living in the richest quintile. Therefore, we can conclude that though CFPR has robust impact on those living in the richest quintile.

Table 5.m- Impact Estimates on Food Security, Income & Its Distribution from DID Unconditional and Conditional & FEM

Outcome Variables	CFPR Impact					
	Unconditional DID		Conditional DID		FEM/REM[12]	
	2005 Over 2002	2008 over 2002	2005 Over 2002	2008 over 2002	2005 Over 2002	2008 over 2002
Self-Perceived Food Security(% of Households)						
Chronic food deficit	-35.5***	-33.1***	-22.5***	-20.1***	-0.25***	-0.23***
Occasional food deficit	13.5***	16.6***	9.5***	12.8***	-	-
Break-even	16.8***	12.5***	10.2***	6.0***	-	-
Surplus	5.2***	4.0***	2.7***	1.3**	-	-
Income (in Taka)						
Per capita Income	969***	1802***	339***	1190***	631***	1442***
Income Sub-Groups by Quintile						
Quintile 1	107***	227**	69	148	219***	347**
Quintile 2	3.0	3.0	-18	-20	-28	-30
Quintile 3	-17	12	-7	21	25	54
Quintile 4	77	161**	67	175**	-93	-31
Quintile 5	1195	1996**	476	1611*	2712*	4286***

***p<0.01, **p<0.05 & *p<0.1.

[12] For quintile 2 & 4, we have reported REM as it is supported by Hausman test.

Chapter 6 Summary and Conclusion

A growing number of past studies have examined the impact on poverty of CFPR program but not much is known about the channels that link the program inputs and poverty impacts. Existing studies have so far also neglected the long-term impact of this program, especially on landholdings, health and distribution of income by quintile. This paper addresses these two gaps using a unique set of balanced panel data collected by BRAC-RED in three rounds (2002, 2005 & 2008). The main objective of this paper is to examine short- and long-term impact of the CFPR on landholdings, health, income of the ultra poor households in rural Bangladesh using conditional and unconditional difference-in-differences (DID) methods. In addition, fixed effects estimation is also applied to check the robustness of the estimates on certain outcomes like total land owned, access to land, land-man ratio, chronic food deficit, income and its distribution. Conditional DID measures true impact of the CFPR on those outcomes after controlling the household characteristics. Though we have estimated two short-term impacts (2005 over 2002 & 2008 over 2005) and one long-term impact (2008 over 2002), this paper concentrates on short term impact (2005 over 2002) and long-term impact to a great extent. Additional short-term impact (2008 over 2005) provides intuition about whether long-term impact is greater than short-term (2005 over 2002) impact, the further issue of sustainability. This would also help to provide trend of the impacts. In particular, this paper examines the distinction between treatment and control group in base year and the impact of the CFPR on coping ability, which is measured in terms of expenses and time to recover from shocks.

For measuring the impact on landholdings, this study uses two different units of measurement: proportion of households owning lands and decimal, which is usually used in rural Bangladesh for land measurement. Based on proportion of households as a unit of measurement, both conditional and unconditional DID find the consistent, significant and positive impact of the CFPR on homestead for long-term. This study also finds similar impact on cultivable and total landholdings. Thus, both DID approaches suggest the robustness of our impact estimates in the long-run for homestead, cultivable and total landholdings. Both methods also find the robust estimates both for short- and long-term in cases of cultivation of others' land, access to land and leasing. Based on decimal as a measurement unit, both DID methods find the robust impact on homestead, total land owned, access to land and land-man ratio in the long-term at best 10% level of significance. This study finds no robust impact on cultivable land and cultivation of others' land both in short- and long-term though we find the robust impact for these two categories using proportion of household as a unit of measurement. Thus unit of measurement could give rise to a contradiction in the impact estimates. Additional check is done applying fixed effects estimate along with DID methods on total land owned, access to land and land-man ratio. Here we have used decimal for impact measurement. The findings suggest that the CFPR has robust impact on total land owned, access to land and land-man ratio only in the long-term

irrespective of the approaches. Here all coefficients are positive though first-difference estimates are negative for all categories. This implies that larger impact of the CFPR program, which is explained by the parallel trend assumption shown in figure 6. This also proves that treatment converges to the control and then succeeds.

Land market participation in terms of mortgage in and out, bought and sold shows the consistent result for short-term (2005 over 2008) and long term. Both DID approaches find the significant impacts except for mortgage-out. As there is a channel effect of landholdings on the food security, we have applied fixed effects along with conditional and unconditional DID to observe the impact on food security. FEM is applied only for chronic food shortage on which we are very much concerned. This study uses self-perceived food security. All three approaches provide very much consistent results for short-term and long-term. This study finds the robust impact of the CFPR on chronic food deficit after applying all three methods. Findings suggest households belong to the program face significantly less chronic food shortages compared to the control. Based on DID approaches, it finds though CFPR contributes to chronic food security, it accelerates occasional food insecurity. However, it is imperative for the program that the short-term impact (2008 over 2005) is no longer significant. Moreover, this study finds the consistent, positive and significant impact on break-even and surpluses. Thus the overall impact of the CFPR on food safety issues is positive.

No significant impact of the program is found for morbidity both in the short- and long-term after using both conditional and unconditional DID. Significant long-term impact is found only for stop working due to illness, which is justified by more ability of the treatment group. As it is evidenced from the literature review that rich people invest more in health, our findings are also supportive to the existing literature as treatment group invests more in health compared to control. Thus the CFPR has positive significant impact on investment in health, which is measured in terms of proportion of people spend on doctor's fee and medicine and transportation costs. It is also evidenced from the proportion of households who spent for health related crisis and also from the amount spent for those crises. CFPR also has wider impacts on consciousness indicator like usage of sanitation though we have the negative impact in 2008 over 2005. This is also evidenced by conditional DID. However, we have estimated conditional DID on some specific issues to check for robustness. In case of severe illness, we find the significant impact of the CFPR, which implies prevalence of severe illness of the beneficiaries significantly declines compared to the control.

This study measures coping ability using unconditional DID. Amount of money spent for crisis is used as a surrogate for measuring coping ability. More expense implies more coping ability of the ultra poor. This study finds the significant impact of the CFPR on ceremonies and severe illness, on which treatment group spends more compared to the control. These are also evidenced from the coping ability measured by time to recover from crisis event. This study finds that treatment group needs significantly less time to recover from high expense for ceremonies. Even the CFPR plays role to the

coping ability for house damages, severe illness and conflict as treatment takes less time, on average, to recover from such shocks compared to the control.

In addition, unlike the previous studies on CFPR impact on income, this study explores the impacts on distribution of income based on quintile. The findings of this study show that impact on per capita income remains consistent and significant irrespective of approaches. However, impact on the distribution on income contradicts with findings on per capita income. This study finds the significant short-and long-term impact for those living in the poorest quintile under unconditional DID. But after imposition of covariates in the regression, no coefficients remain significant. But the coefficients are significant both in the short- and long-run under FEM. Thus this study finds no robust estimates for income of those living in quintile 1 after applying three methods of impact estimation. Under three approaches, this study finds no significant impact estimates on income of those living in quintile 2 and 3. Both DID approaches find the long-term significant impact on income of those in quintile 4. But we find no significant impact on quintile 4 after using FEM. Quintile 5 shows that per capita income remains consistent and significant irrespective of approaches only in the long-run. Thus the impact estimate is robust only for those living in the richest quintile.

The results of this paper also point to some important areas of policy interventions. The results confirm the importance of natural and human capital- land and health- as determinants of per capita income. People living in the poorest quintiles have fewer assets (natural, physical, human, financial and social) than the richest quintile. This emphasizes the need for policy interventions to increase access to land and health care facilities and to provide the poorest among the ultra poor with more opportunities to accumulate assets. Such interventions should include both strategies to enable the poorest among the ultra poor to accumulate human, natural and physical assets over time and to preserve their asset base against shocks. The findings also suggest for reshaping the existing 'push down' and 'push out' approaches to reach the poorest of the ultra poor. As to conclusions for further research, this study addresses the need to identify the reasons why the poorest among the ultra poor are not being benefitted from the CFPR in order to design better policy options and interventions for them. Further future research would be helpful to explore the impacts after controlling shocks to check whether existing impacts sustainable or not.

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Appendices

Table A.1- Prevalence and Dynamics of Shocks at the Ultra Poor Households

Crises events	2002		2005		2008	
	Mean	SD	Mean	SD	Mean	SD
Shocks prevalence (% of households)						
House severely damaged	40.2	0.49	15.7	0.36	8.7	0.28
Members severely ill	24.7	0.43	17.2	0.38	13.8	0.34
Food related problem	52.6	0.50	19.6	0.39	18.6	0.39
High expenditures for ceremonies	5.0	0.22	6.4	0.24	6.3	0.24
EM or NEM member died	3.1	0.17	2.0	0.14	1.8	0.13
Livestock died	4.0	0.20	6.0	0.23	4.9	0.22
Conflict/dispute of legal case	0.9	0.09	1.20	0.11	0.8	0.09
Theft/robbery	0.6	0.08	0.8	0.09	0.4	0.06
Earning member died	-	-	1.06	0.10	1.03	0.10
Non-earning member died	-	-	0.95	0.09	0.79	0.09
N	**4549**		**4549**		**4549**	

Note: Tabulated by author from CFPR-TUP longitudinal survey data. – implies no baseline data.

Table A.2- Mean Time to Recover from Crisis

Shocks	2005	
	Mean time(in month)	SD
House severely damaged	0.54	0.81
Members severely ill	0.91	1.31
Food related problem	0.01	0.23
High expenditures for ceremonies	1.85	2.44
Livestock disease	0.11	0.42
Livestock died	1.13	1.20
Poultry disease	0.04	0.31
Poultry died	0.25	0.50
Conflict/dispute of legal case	1.6	2.85
Theft/robbery	0.76	1.13
Earning member died	0.77	0.81
Non-earning member died	0.29	0.53

Note: Figures reported apply to those who faced crises.

Table A.3- First-Difference and Unconditional DID Estimates on Landholdings

Landholdings	2002 (Baseline)			2005 (End of the Program)			2008 (Three years later After the end of program)			Impacts using unconditional DID		
	T	C	D	T	C	D	T	C	D	2005 over 2002	2008 over 2002	2008 over 2005
Landholdings (% of Households)												
Homestead	47.9	61.4	-13.5***	49.9	56.3	-6.4***	65.2	66.0	-0.8	7.1***	12.7***	5.6***
Cultivable	1.42	6.01	-4.59***	4.1	6.0	-1.9***	6.8	6.1	0.7	2.6***	5.2***	2.7***
Uncultivable	0.84	1.39	-0.55*	1.6	1.9	-0.3	1.8	1.9	-0.1	0.3	0.5	0.3
Total	48.6	62.6	-14.0***	51.9	58.2	-6.3***	66.5	67.0	-0.5	7.6***	13.5***	5.8***
Cultivate others	4.04	5.61	-1.57**	24.4	16.9	7.3***	25.2	12.4	12.8***	8.9***	14.3***	5.4***
Access to land	50.47	63.88	-13.42***	62.8	63.6	-0.8	73.7	69.6	4.1***	12.6***	17.5***	4.9**
Access for leasing	37.6	42.6	-5.0***	37.5	23.2	14.3***	50.0	36.3	13.7***	19.3***	18.8***	-0.6
Amount of land (in decimal)												
Homestead owned	1.9	3.3	-1.4***	2.3	3.0	-0.7***	3.2	3.6	-0.4***	0.7***	1.0***	0.3
Cultivable owned	0.2	2.0	-1.8***	0.5	1.9	-1.4***	1.0	1.8	-0.8**	0.4	1.0**	0.6
Uncultivable owned	0.1	0.3	-0.2	0.1	0.3	-0.2	0.1	0.2	-0.1	0.0	0.1	0.06
Total owned	2.2	5.6	-3.4***	2.9	5.1	-2.2***	4.3	5.6	-1.2***	1.1**	2.2***	1.0*
Cultivate others	1.0	1.9	-0.9***	6.0	5.9	0.1	6.2	4.1	2.1***	1.0*	3.0***	2.0***
Access to land	3.2	7.5	-4.3***	9.0	11.1	-2.1***	10.5	9.7	0.9	2.2***	5.2***	3.0***
Land -man ratio	0.7	1.5	-0.8***	0.9	1.2	-0.3***	1.2	1.2	0.0	0.4***	0.7***	0.3**
Mortgage, buying and selling (% of households)												
Mortgage in	-	-	-	14.5	5.0	9.5***	21.2	4.6	16.7***	-	-	7.2***
Mortgage out	-	-	-	1.1	2.0	-0.9**	0.7	1.4	-0.7**	-	-	0.2
Bought	-	-	-	8.8	2.7	6.1***	10.1	1.9	8.2***	-	-	2.1**
Sold	-	-	-	1.3	3.4	-2.1***	0.7	1.1	-0.4	-	-	1.7***

Note: Tabulated by author from CFPR longitudinal survey data. T and C stand for treatment and control groups respectively and D stands for mean difference between treatment and control. ***p<0.01, **p<0.05 and *p<0.1. – implies unavailability of data for the base period.

Table A.4- First-Difference and Unconditional DID Estimates on Food Security, Income and Its Distribution

Outcome Variables	2002			2005			2008			Impacts		
	T_1	C_1	D_1 (T_1-C_1)	T_2	C_2	D_2 (T_2-C_2)	T_3	C_3	D_3 (T_3-C_3)	2005 Over 2002 (D_2-D_1)	2008 over 2002 (D_3-D_1)	2008 over 2005 (D_3-D_2)
Self-Perceived Food Security(% of Households)												
Chronic food deficit	61.8	41.3	20.5***	14.7	29.7	-15.0***	19.6	32.2	-12.5***	-35.5***	-33.1***	2.5
Occasional food deficit	35.8	49.3	-13.6***	53.3	53.4	-0.1	58.3	55.3	3.0**	13.5***	16.6***	3.1
Break-even	2.4	8.0	-5.6***	25.0	13.8	11.2***	18.5	11.7	6.8***	16.8***	12.5***	-4.4***
Surplus	0.04	1.4	-1.3***	7.0	3.1	3.9***	3.6	0.9	2.6***	5.2***	4.0***	-1.2
Income (in Bangladesh Taka)												
Per capita Income	2493	2785	-292***	4293	3615	678***	7480	5970	1510***	969***	1802***	832***
Income Sub-Groups by Quintile												
Quintile 1	1233	1265	-32	1406	1332	75**	1292	1098	194**	107***	227**	119
Quintile 2	2436	2443	-7	2499	2503	-4	2530	2534	-4	3.0	3.0	0.02
Quintile 3	3567	3526	41	3600	3577	23	3694	3641	53**	-17	12	30
Quintile 4	5048	5068	-20	5164	5106	58	5374	5233	141***	77	161**	84*
Quintile 5	9040	10120	-1080	8901	8786	115	10276	9360	916***	1195	1996**	801***

Note: Tabulated by author from CFPR-TUP longitudinal survey data. ***p<0.01, **p<0.05 and *p<0.1

Table A.5- First-Difference and Unconditional DID Estimates on Health Issues

Variables	2002			2005			2008			Impacts		
	T_1	C_1	D_1 (T_1-C_1)	T_2	C_2	D_2 (T_2-C_2)	T_3	C_3	D_3 (T_3-C_3)	2005 (D_2-D_1)	2008 (D_3-D_1)	2008 (D_3-D_2)
Sickness from last 15 days recall												
Sickness (% of people)	14.7	14.2	0.5	15.8	16.4	-0.6	12.8	13.1	-0.3	-1.1	-0.7	0.3
Sickness of HHH (% of HHs)	16.3	17.0	-0.7	20.9	18.7	2.2	17.8	16.2	1.5	2.9	2.2	-0.7
Severe illness (% HHs) last 1 year	24.4	25.1	-0.7	16.7	17.7	-1.0	14.2	13.4	0.8	-0.3	1.5	1.8
Disability (% of ultra poor people)	2.1	1.8	0.3	1.9	1.7	0.2	2.4	1.9	0.5	-0.1	0.2	0.3
No of sick member	1.29	1.30	-0.01	1.3	1.34	-0.04	1.31	1.33	-0.02	-0.03	-0.01	0.03
Stopped working (%)+	22.9	21.9	1.0	40.3	38.0	2.3	43.7	36.6	7.1***	1.3	6.2***	4.8
Days suffered	2.5	2.4	0.1	5.4	5.4	0.0	6.5	6.0	0.5	-0.1	0.4**	0.6**
Work days lost+	3.7	2.3	1.4	4.1	3.5	0.6	6.2	6.1	0.1	-0.8	-1.3	-0.5
Proportion spent on doctor/med.+	67.1	73.4	-6.3***	81.1	81.4	-0.3	87.5	86.2	1.3	6.1***	7.7***	1.6
Proportion spent for transport+	10.9	16.9	-6.0***	14.2	14.0	0.2	20.5	20.3	0.2	6.2***	6.2***	-0.1
Fee plus medicine cost(Taka)+	46	103	-57***	120	111	9	185	121	64***	66***	121***	55**
Transportation cost (Taka)+	2.6	8.7	-6.1***	4.8	3.9	1.1	8.6	14.4	-5.8	7.1***	0.3	-6.9
Drink tube well water (% HH)	97.7	97.5	0.2	99.6	99.0	0.6**	95.5	95.4	0.1	0.4	-0.1	-0.6***
Use sanitary latrine (% HH)	2.3	4.3	-2.0***	77.3	42.9	34.4***	71.1	55.8	15.3***	36.3***	17.3***	-19.1***

Note: Tabulated by author from CFPR-TUP longitudinal survey data. + implies the households those reported sickness only. ***p<0.01, **p<0.05

Table A.6- Impact of the CFPR on Landholdings and Chronic Food Deficit Using FEM

Explanatory variables	Dependent variables			
	(1)	(2)	(3)	(4)
	Total land	Land Access	Land-man ratio	Always food deficit
CFPR-TUP*2005	0.593	0.459	0.215*	-0.254***
	(0.440)	(0.790)	(0.124)	(0.021)
CFPR-TUP*2008	1.581***	3.387***	0.504***	-0.227***
	(0.473)	(0.751)	(0.114)	(0.021)
Household size	0.286	1.780***	-0.204***	0.005
	(0.230)	(0.549)	(0.044)	(0.008)
Age HHH	0.008	-0.028	0.004	0.002*
	(0.037)	(0.056)	(0.008)	(0.001)
Sex HHH	-0.361	-1.486	0.019	0.118***
	(0.538)	(0.978)	(0.195)	(0.029)
Married(=1 if married)	0.886	2.757**	0.350	-0.014
	(0.651)	(1.184)	(0.299)	(0.030)
Education HHH (years)	-0.143	0.144	-0.023	0.009
	(0.214)	(0.378)	(0.050)	(0.009)
Literate (=1 if literate)	0.565	0.595	-0.031	-0.110**
	(1.233)	(1.930)	(0.278)	(0.055)
No of earning member	-0.008	-0.001	-0.002	0.005
	(0.142)	(0.234)	(0.039)	(0.006)
Savings (=1 if yes)	0.734**	2.411***	0.293***	-0.135***
	(0.345)	(0.593)	(0.089)	(0.014)
Year 2005	-0.598*	2.747***	-0.211**	-0.113***
	(0.357)	(0.597)	(0.089)	(0.014)
Year 2008	-0.325	0.833	-0.146	-0.092***
	(0.379)	(0.663)	()0.096	(0.016)
Constant	1.933	-2.037	1.419***	0.400***
	(1.486)	(3.104)	(0.417)	(0.066)
No of observation	**13,569**	**13,569**	**13,569**	**13,569**
Hausman Chi2	**93.62**	**65.71**	**94.58**	**194.31**
Prob>chi2	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Note: Tabulated by author from CFPR-TUP longitudinal survey data. ***p<0.01, **p<0.05 and *p<0.1. Robust standard errors are in the parentheses.

Table A.7- Impact of the CFPR on Income using FEM

Explanatory variables	Per capita Income (1)	Log of per capita income (2)
CFPR-TUP*2005	631.22***	0.188***
	(97.36)	(0.027)
CFPR-TUP*2008	1442.08***	0.228***
	(130.45)	(0.028)
Household size	-827.96***	-0.155***
	(84.96)	(0.015)
Age HHH	-15.38*	-0.004**
	(8.24)	(0.002)
Sex HHH	-362.97*	-0.138***
	(189.98)	(0.043)
Marital status (=1 if married, 0, otherwise	-382.62*	-0.121***
	(209.43)	(0.045)
Education HHH (years)	5.51	0.004
	(51.99)	(0.015)
Literate (=1 if literate, 0, otherwise)	64.66	-0.051
	(278.16)	(0.073)
No of earning member	-149.21***	-0.049***
	(42.35)	(0.008)
Savings (=1 if yes, 0, otherwise)	430.88***	0.109***
	(74.48)	(0.017)
Year 2005	1153.36***	0.371***
	(74.61)	(0.019)
Year 2008	3791.77***	0.949***
	(118.64)	(0.023)
Constant	6994.16***	8.606***
	(567.41)	(0.110))
No of observation	13,543	13,509
Hausman Chi2	238.19	286.11
Prob>chi2	0.0000	0.0000

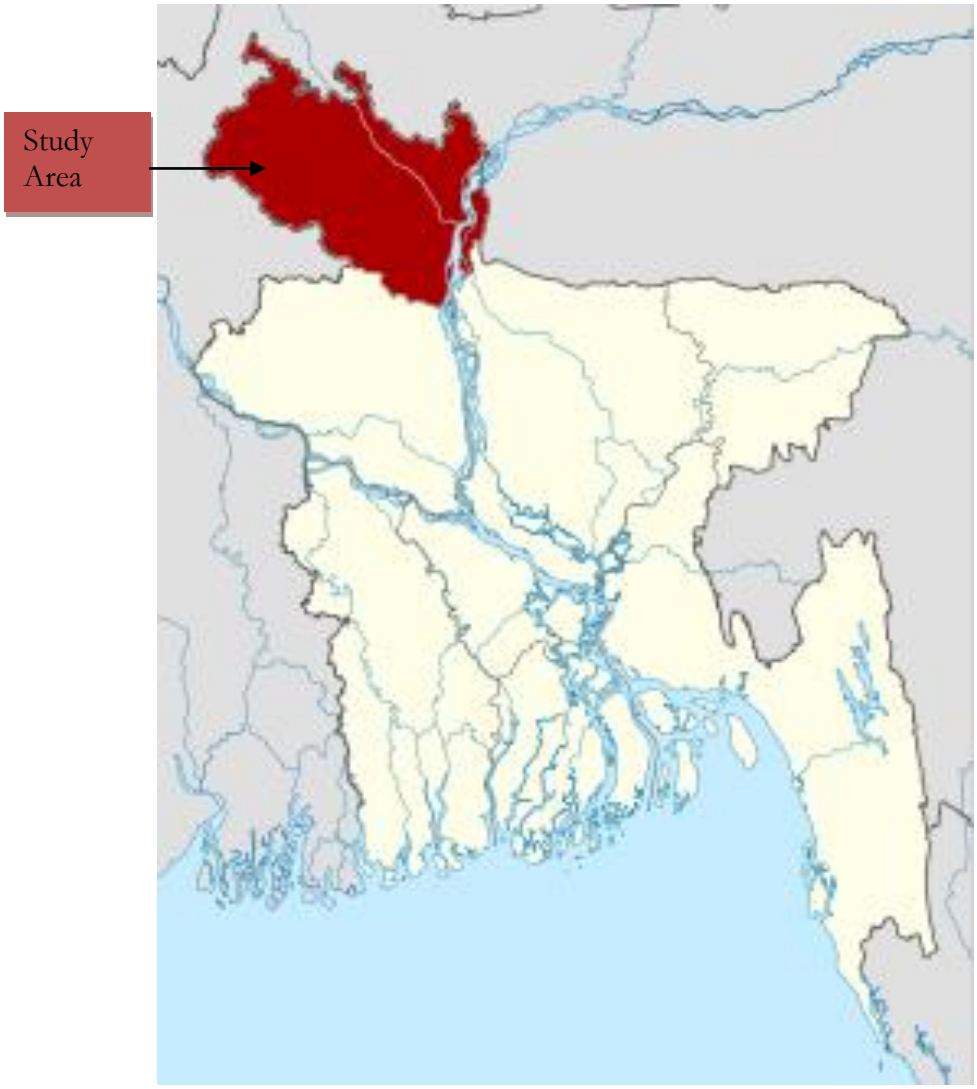
Note: Author Tabulated from CFPR-TUP longitudinal survey data. Robust standard errors are in the parentheses. *****p<0.01, **p<0.05 and *p<0.1.**

Table A.8- Impact of the CFPR on Distribution of Income Using FEM & REM

Explanatory variables	(1) Quintile1	(2) Quintile2	(3) Quintile3	(4) Quintile4	(5) Quintile5
	FEM	**REM**	**REM**	**FEM**	**FEM**
CFPR-TUP*2005	219.40***	-27.79	24.57	-93.04	2712.33*
	(73.82)	(21.52)	(23.87)	(124.60)	(1529.28)
CFPR-TUP*2008	346.67**	-29.71	54.36*	-31.15	4285.67***
	(147.13)	(37.29)	(28.62)	(137.00)	(1573.86)
Household size	-6.13	-17.24***	-19.66***	-139.89***	-1236.46***
	(37.95)	(4.15)	(4.82)	(42.14)	(299.93)
Age HHH	-3.70	0.68	-0.69	-12.59	11.44
	(4.53)	(0.52)	(0.57)	(7.88)	(28.41)
Sex HHH	182.77	11.18	-55.05	-100.24	545.80
	(131.79)	(27.00)	(33.87)	(191.82)	(988.28)
Marital status (=1 if married, 0, otherwise	121.31	32.48	-42.23	-123.33	-146.10
	(127.69)	(29.14)	(35.49)	(213.36)	(868.21)
Education HHH (years)	-19.10	1.09	0.93	-144.62**	-550.37
	(43.49)	(5.62)	(6.43)	(68.84)	(502.89)
Literate (=1 if literate, 0, otherwise)	5.49	-21.23	-8.24	230.45	1128.84
	(224.78)	(39.94)	(43.06)	(368.09)	(2145.55)
No of earning member	-3.97	8.91	7.15	-33.36	121.19
	(28.25)	(7.67)	(8.87)	(39.82)	(332.13)
Savings (=1 if yes, 0, otherwise)	-38.87	35.99**	-3.57	-16.59	513.99
	(61.58)	(16.03)	(18.17)	(73.87)	(506.06)
Year 2005	81.50*	70.99***	50.28**	131.25	-1968.31
	(48.40)	(15.96)	(19.83)	(87.47)	(1230.24)
Year 2008	-22.00	113.18***	132.65***	500.96***	-297.94
	(98.30)	(23.89)	(22.45)	(100.16)	(1289.22)
Constant	1288.73***	2428.71***	3676.10***	6346.32***	11589***
	(294.76)	(41.82)	(47.49)	(430.93)	(1755.12)
No of observation	**2709**	**2761**	**2657**	**2709**	**2707**
Hausman Chi2	**22.19**	**16.61**	**16.52**	**22.81**	**39.88**
Prob>chi2	**0.0354**	**0.1648**	**0.1684**	**0.0294**	**0.0001**

Note: Tabulated by author from CFPR-TUP longitudinal survey data. Robust standard errors are in the parentheses. ***p<0.01, **p<0.05 and *p<0.1.

Map A.1 Study Area-Rangpur Division



Source: http://en.wikipedia.org/wiki/File:Bangladesh_location_map-Rangpur_Division.svg

Map A.2 Map of Bangladesh

Source: http://www.mapsofworld.com/bangladesh/bangladesh-political-map.html