

Climbing Up the Ladder and Watching Out for the Fall: Poverty Dynamics in Rural Bangladesh

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13.1 Introduction

In Bangladesh, the pace of economic growth accelerated in recent years, with real GDP growing at a rate of 6.5 percent on average per year between 2010 and 2016, reaching 7.3 percent in 2017—the highest in the country’s history. The incidence of poverty in Bangladesh was cut in half in the past 16 years, dropping from 48.9 percent in 2000 to 24.3 percent in 2016. In rural areas, poverty headcount declined from 52.3 percent to 26.4 percent over the same period (BBS 2017).

These static poverty estimates from cross-sectional survey data are important to examine the underlying factors of poverty reduction, such as the effects of economic growth and public policy. However, if there has been substantial mobility into and out of poverty in the country, then identifying the enabling factors to escape poverty and the events that drive one into poverty through longitudinal studies such as the present one can be instrumental in formulating poverty alleviation policies and programs.

Although there are numerous poverty studies in Bangladesh, most of these studies are based on cross-sectional data. There are only a few studies that have used panel data to examine poverty dynamics in Bangladesh, of which, some are based on general purpose surveys while others focus on the impact of some targeted programs for the poor. The most notable contribution in the first category are the papers by Sen (2003), Nargis and Hossain (2006), and Hossain and Bayes (2009). Using a “livelihoods” framework and using data from a 21-village survey in Bangladesh conducted in 1987-1988 and 2000, Sen (2003) finds that households moved out of poverty by pursuing multiple strategies such as crop intensification, agricultural diversification,

off-farm activity, and migration, which led to accumulating a variety of assets. On the other hand, households who fell into poverty experienced crises such as ill health and flooding. Nargis and Hossain (2006), and Hossain and Bayes (2009) used a nationally representative panel data from 62 villages spanning from 1988 to 2004 for their analysis. Nargis and Hossain (2006) identified occupational shift from farm to nonfarm sector, expansion of cultivated area through tenancy, overseas migration income, and enhancement of human and physical capital endowments as pathways out of poverty.

Based on a panel dataset generated for evaluating targeted programs, remarkable work has been done by Quisumbing (2011), Quisumbing and Baulch (2009) and Davis and Baulch (2009) concerning the impact of three targeted interventions in three different locations in rural Bangladesh, covering the period from 1994 to 2007. For instance, Quisumbing (2011) finds that years of schooling of household head, the value of non-land assets, and having more dependents in the households are negatively associated with chronic poverty. Shocks arising from an income earner falling sick are also an important contributor to poverty. Drawing from life history interviews to investigate poverty dynamics in Bangladesh, Davis (2006) finds that most improvements tend to only happen gradually, whereas declines are often more sudden.

This paper aims to fill the gap in understanding the determinants of poverty dynamics in rural Bangladesh using a nationally representative longitudinal survey of 5,260 households—the Bangladesh Integrated Household Survey (BIHS)—employing a multinomial logit, logit, and simultaneous quantile regression models. Previous studies, like Sen (2003) and Nargis and Hossain (2006), although based on a nationally representative panel dataset, only used descriptive analysis to examine the characteristics of poverty dynamics categories, while others like Quisumbing (2011) analysed poverty dynamics for targeted programs using sub-samples of the rural population. Thus, this paper is a pioneer in the sense that it identifies the factors that determine households' movements into and out of poverty and helps explain why some households remain poor. By drawing on the findings of this research, policymakers will be better equipped to design appropriate policies to address persistent poverty such as enabling the poor to accumulate assets, and policies that focus on transient poverty by building resilience through insurance and social protection mechanisms.

The chapter is organized in six sections. Section 13.2 describes the data collected in 2011-2012 and 2015 through the BIHS. In Section 13.3, we describe the method of measuring poverty used in this study. In Section 13.4, we

provide a descriptive analysis of poverty dynamics in rural Bangladesh. Section 13.5 presents the results from estimated multivariate models—multinomial logit, logit, and simultaneous quantile regressions. Section 13.6 summarizes the results and discusses their policy implications.

13.2 The Data

The data for this study came from a two-round panel survey, the Bangladesh Integrated Household Survey (BIHS), which was designed and supervised by researchers at the International Food Policy Research Institute (IFPRI), including the authors of this paper. The sample is nationally representative of rural Bangladesh and representative of rural areas of each of the seven administrative divisions of the country. BIHS is the only nationally representative survey in Bangladesh that collects detailed data on (1) plot-level agricultural production and practices, (2) dietary intake of individual household members, (3) anthropometric measurements (height and weight) of all household members, and (4) data to measure the Women's Empowerment in Agriculture Index (WEAI).

IFPRI conducted the first round of the BIHS from November 2011 to March 2012, and the second round from January to June 2015, which was administered on the same sample of households surveyed in 2011-2012, creating a two-round panel (that is, longitudinal surveys). The periods of both survey rounds were normal according to major indicators: national yields of *boro* rice—the dominant crop grown during the November-June period—were 3.94 tons per hectare in 2011-2012 and 3.97 tons per hectare in 2015-2016; there were no significant changes in prices of agricultural inputs and outputs; and weather-related factors were normal. Even though the timing of the two rounds of surveys did not exactly overlap, this is unlikely to cause any bias in the results because seasonal factors have become much less pronounced in rural Bangladesh in the past two decades, mainly due to irrigation-induced stability in rice production and prices and remarkable improvements in infrastructure, such as roads, bridges, and electricity supply.

The sample design of the BIHS followed a stratified sampling in two stages—selection of primary sampling units (PSUs) and selection of households within each PSU—using the sampling frame developed from the community series of the 2001 Population and Housing Census of Bangladesh. The total sample size in Round 1 is 5,503 households in 275 PSUs, which were allocated among the seven strata (that is, seven divisions) with probability proportional to the number of households in each stratum. Sampling weights were adjusted based on the latest population census of 2011. Taking attrition and split households

into account, the total sample size in Round 2 is 5,447 households, which includes a panel of 5,260 households. Sampling weights for the second round were updated to retain representativeness of the sample at the rural national level and each of the seven administrative divisions of the country.

13.2.1 Attrition and Split Households

From the Round 1 survey sample in 2011-2012 to Round 2 in 2015, there was 4.41 percent attrition overall, or 1.26 percent attrition per year, which is an acceptable level of attrition in survey data. Table 13.1 shows the status of the households interviewed from the 2015 Round 2 survey. After accounting for attrition, the sample of 5,260 households was used to construct the panel to analyze poverty dynamics.

Table 13.1: Status of Households Surveyed in 2011-2012 and 2015 BIHS

Interview status	Frequency (no. of households)	Percentage of Round 1	Cumulative percentage
Completed in 2015	5,260	95.58	95.58
Refused	11	0.20	95.78
Not at home	26	0.47	96.26
Migrated	206	3.74	100.00
Completed in 2011-2012	5,503	100.00	

Source: IFPRI Bangladesh Integrated Household Survey (BIHS), 2011-2012 and 2015 longitudinal surveys.

13.3 Measuring Prevalence of Poverty

The prevalence of poverty is measured as the percentage of individuals living below the poverty line. Poverty prevalence is sometimes referred to as the poverty incidence or poverty headcount ratio. This paper uses the international poverty line of \$1.25 per person per day, converted into the local currency equivalent (LCE) at 2005 “Purchasing Power Parity” (PPP) exchange rates, then adjusted for cumulative inflation from 2005 to the month and year the population-based survey data were collected using a consumer price index. The 2005 PPP exchange rate for Bangladesh is \$1 = 25.49389.¹ For the price index, we used the rural food consumer price index (FCPI) estimated by the Bangladesh Bureau of Statistics (BBS). The rationale for using the FCPI is that food expenditure is the major part of

¹ Retrieved from <http://databank.worldbank.org/data/home.aspx>

the rural household's consumption basket. According to BBS (2011), rural households spend 58.9 percent of their monthly consumption expenditure on food and beverages. The FCPI (base year 2005-2006) used for 2011-2012 data is 185.01 and for 2015 is 224.34. The LCE is calculated as:

$$LCE = \left[\frac{1.25 \times PPP_{2005}}{100} \right] \times FCPI$$

This study uses consumption expenditures as the principal indicator of household welfare and uses per capita expenditure as a proxy for income for two reasons. First, expenditures are likely to reflect permanent income and, hence, are a better indicator of consumption behavior (Friedman 1957). Second, data on expenditures are generally more reliable and stable than income data. Since expenditures are intended to serve as a proxy for income, the terms "expenditure" and "income" are used interchangeably.

The measure of total consumption expenditure is quite extensive and draws upon responses to several sections of the household survey. In brief, consumption is measured as the sum of total food consumption and total nonfood (nondurable and durable) expenses. Expenditures on individual consumption items were aggregated to construct total expenditures. Quantities of goods produced by the household for home consumption were valued at the average unit market prices of commodities.

The poverty rate is estimated by dividing the number of household members in poor households in the sample by the total number of household members in the households in the sample.

Using the \$1.25 (2005 PPP) per person per day international poverty line, we find that poverty went down from 32.1 percent in 2011-2012 to 27.2 percent in 2015—a reduction of 4.9 percentage points over the three-and-a-half-year period. This rate of reduction of poverty per year is similar to the national estimates released by BBS.

13.4 Poverty Dynamics

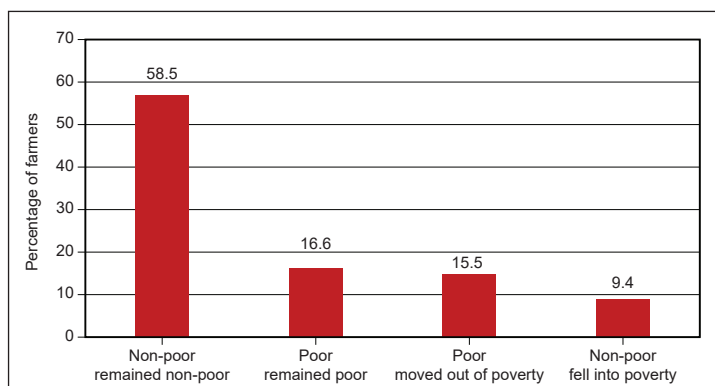
The state of being poor or non-poor can be temporary, as the household can escape or fall back into the clutches of impoverishment in subsequent time periods. Baulch and Hoddinott (2000) describe this temporal component of impoverishment as a dynamic of poverty. It is important to examine the factors that affect both chronic and transitory states of poverty, since different policies may have different implications for each state (Jalan and Ravallion 2000; Hulme and Shepherd 2003; McKay and Lawson 2003). If different factors drive the two states of poverty, then different policies may well be called for (Jalan and Ravallion 2000). Thus, the use of panel data

to examine the determinants of poverty dynamics of rural households in Bangladesh provides unique insights into the causes driving persistent and transitory poverty, and enables us to recommend policies to address the two states of poverty for poverty alleviation.

For this paper, we have broken down transitory poverty into two categories: (i) falling into poverty, and (ii) moving out of poverty. This disaggregation of transitory poverty enables us to understand whether factors driving households to move out or fall into poverty are different. Thus, between the two survey rounds, for our analysis, we have four states of poverty dynamics that a household can belong to: (i) always poor, (ii) fell into poverty, (iii) moved out of poverty, or (iv) never poor. Always poor households can be viewed as persistently poor or chronically poor, whereas households that moved out of or fell into poverty can be considered transient poor.

Figure 13.1 shows the percentage of the rural population in each of the poverty dynamics categories. According to BIHS data, 58.5 percent of the rural population was never poor between the two rounds of the BIHS, while 16.6 percent of the population was persistently poor during this time. There is evidence of a remarkable degree of longitudinal mobility in both directions, with 15.5 percent of the population moving out of poverty and 9.4 percent falling into poverty between the two rounds of the BIHS.

Figure 13.1: Poverty Dynamics Categories as Percentage of the Total Rural Population



Source: IFPRI Bangladesh Integrated Household Survey (BIHS), 2011-2012 and 2015 longitudinal surveys.

We present a poverty transition matrix in Table 13.2 to describe the upward or downward mobility of households based on their consumption expenditure levels in 2011-2012 and 2015. We track the movement of

households from below the poverty line to between poverty line and twice the poverty line or to above twice the poverty line. Similar methods have been used in Haddad and Ahmed (2002) and McCulloch, Weisbrod, and Timmer (2007).

In the BIHS panel sample, of the 1,468 households that were below the poverty line in 2011-2012, 64 households (4.4 percent) have consumption levels more than twice the poverty line in 2015, and 672 households (45.8 percent) have moved up to consumption levels above the poverty line but below two times the poverty line. On the other hand, of the 1,255 households below the poverty line in 2015, 523 households (41.7 percent) were above the poverty line in 2011-2012. We see that 3,086 households have not moved between categories, which are 58.7 percent of the total sample. Consumption improved in 1,295 households (24.6 percent of our total sample), whereas it worsened in 879 households (16.7 percent of total sample).²

Table 13.2: Poverty Transition Matrix, 2011-2012 to 2015 (Raw Number of Households, Not Weighted)*

Households with per capita expenditure in 2011-2012	Households with per capita expenditure in 2015			
	Below z	Between z and $2z$	Above $2z$	Total
Below z	732	672	64	1,468
Between z and $2z$	485	1,739	559	2,783
Above $2z$	38	356	615	1,009
Total	1,255	2,767	1,238	5,260

* z is the estimated poverty line of \$1.25 converted to local currency equivalent as described earlier.

Source: IFPRI Bangladesh Integrated Household Survey (BIHS), 2011-2012 and 2015 longitudinal surveys.

13.4.1 Measurement Error

Baulch and Hoddinott (2000) point out that it is critical for any poverty dynamics or economic mobility study to look at the issue of measurement error. This is particularly important for empirical measurement of poverty dynamics in the short-term and for households with consumption expenditures close to the poverty line. Errors in estimating consumption expenditure may arise

² The percentages presented in this discussion are unweighted percentages generated from the figures in Table 13.2.

because of difficulties in recall and imputed values for own production. Such errors can show households above or below the poverty line when in fact their poverty status has remained unchanged. Thus, the extent of entry and exit from poverty is likely to be overstated if poverty dynamics are measured in the short-term or for households with consumption expenditures close to the poverty line (Dercon and Shapiro 2007).

Since measurement errors can have confounding effects on conclusions drawn from inflated variances in poverty status, we followed the approach of Alderman and Garcia (1993) to treat the measurement error. Their theoretical analysis regressed the changes in the value of assets (which can be assumed to be well-measured) to changes in consumption expenditure to see if there is any relation between asset changes and income changes. If measured changes in welfare are caused by measurement error, then no relationship should exist between the variables. In a similar manner, we regressed change in daily per capita expenditure on change in household size, the change in value of assets owned by the household and change in cultivable land owned by the household, and found that there are statistically significant variations in a first difference (fixed effects) regression. The coefficient of determination (R-squared) value for the first difference regression is 0.24. This means that variations in expenditure in our data between 2011-2012 and 2015 are due to variations in productive assets and probably not due to measurement error.

13.5 Determinants of Poverty Components

13.5.1 Regression Models

Studies analyzing poverty dynamics usually use models that assess the risk of a household or an individual remaining poor for a given period of time (Jenkins 2000). However, such models require many panel waves. For studies with fewer data points, discrete choice models are used, as are models that use changes in continuous welfare measures like income or expenditure.

Among discrete choice models used in studies of poverty dynamics, the Multinomial Logit Model (MNL) is the most commonly used model (Baulch 2011). Since our dataset on Bangladesh has two time periods and we are interested in examining factors driving persistent and transient poverty, we resort primarily to a multinomial logit model for our analyses. Though ordered logit or probit models are also used in similar circumstances, we chose MNL because “although poverty status is based on an underlying welfare measure (per capita expenditure) defined on an interval scale, it is not always appropriate to assume that persistent poverty represents a higher level of deprivation than transient poverty, as would be implied by treating

it as an ordinal variable” (Bhatta and Sharma 2011). Thus, it is reasonable to assume poverty dynamic categories as nominal variables and to use a MNL model to examine factors influencing persistent and transitory poverty (Edig and Schwarze 2011; Bhatta and Sharma 2011).

In our MNL model, the probability P_{ij} that a household (i), is in a poverty status (j), can be expressed as a function of the independent variables (x_i) as follows:

$$P_{ij} = \frac{e^{x_i \beta_j}}{1 + \sum_{k=1}^3 e^{x_i \beta_k}} \text{ for } j = 0, 1, 2, 3,$$

where β_j are the set of coefficients to be estimated. To identify the model β_0 is set to zero (the base category), since if unidentified there is more than one solution for $\beta_1 \dots \beta_j$ that leads to the same probabilities for P_{ij} (Greene 2003).

Since the coefficients of the MNL model cannot be interpreted directly (Greene 2003), we report the relative risk ratios or log-odds ratio. Suppose,

$$P(y_i = j) = p_{ij}$$

where P is the probability that a household i is in a poverty state j . As everything in a MNL model is stated relative to a base category (say 0),

$$\frac{p_{ij}}{p_{i0}} = \exp(x_{ij} \beta_j)$$

where p_{i0} is the probability of $j = 0$, which is relative risk to the base category. The log-odds or exponentiated coefficient in MNL is the ratio of two relative risks. For example, given $X_{ij} + 1$ and X_{ij} the relative risk would be:

$$\frac{p'_{ij}}{p'_{i0}} = \exp((x_{ij} + 1) \beta_j), \text{ such that}$$

$$\exp(\beta_j) = \frac{p'_{ij}/p'_{i0}}{p_{ij}/p_{i0}}$$

is the relative risk ratio (RRR) (Edig and Schwarze 2011). The RRR shows how the probability favoring an outcome—that is, a poverty state j (compared to the base state) is multiplied per unit increase in the value of the associated explanatory variable x , when we control for the other variables in the model (Bhatta and Sharma 2011; Wooldridge 2010). Hence, an RRR value greater than 1 indicates a positive relationship between the explanatory variable and the poverty outcome under consideration (the probability of becoming chronic or transient poor increases), while an RRR less than 1 indicates a

negative association (the probability of becoming chronic or transient poor decreases) (Bhatta and Sharma 2011; Edig and Schwarze 2011).

One of the most important assumptions underlying the MNL model is the independence of irrelevant alternatives (IIA). IIA implies that inclusion or exclusion of categories in the MNL does not affect the probabilities associated with the regressors in the remaining categories—that is, the various outcomes must happen independent of each other (Justino and Litchfield 2003; Edig and Schwarze 2011). Hausman and McFadden (1984) proposed a test for this assumption using the *hausman* command. However, the standard Hausman test has several limitations (StataCorp 2013). For example, the test requires access to a fully efficient estimator, which may not be available when analyzing complex survey data, as is the case in our model. Thus, to test whether the IIA assumption holds for our dataset, we utilized the *suest* (seemingly unrelated estimations) command in the STATA 14 statistical software package, followed by the *test* command to test the equality of estimates. We found that there are no significant differences in the coefficients from each alternative in the model—that is, the IIA was found to be satisfied.

We used explanatory variables only from the first survey round (2011–2012) because we are interested in how initial endowments of human and physical capital, and occupational and social choices affect the evolution of the state of poverty over time. The use of lagged explanatory variables also helps to solve the issue of endogeneity (reverse causality) in the model (Baulch and Dat 2011; Hansen and Singleton 1982).

The primary criticism against using a discrete choice model like the MNL model is that it reduces a continuous variable like income or expenditure to discrete categories. This shift from a quantitative continuous variable (expenditure) to qualitative discrete variable (poverty status) also leads to loss of information (Deaton 1997). There is evidence in the literature to use continuous variable models to cross check the results of discrete choice models (Baulch 2011). To check the robustness of our results, we first employ a logit regression on the transient poverty categories using the same explanatory variables as used in the MNL model. We then employ a simultaneous quantile regression to see if the dependent variable (in this case, the log per capita daily expenditure) responds differently to the explanatory variables across the expenditure distribution for expenditure quintile corresponding to the persistently poor, never poor, those who moved out of poverty, and those who fell into poverty.

13.5.2 Results

This section presents the results from three types of regression models—MNL, logit regression, and simultaneous quantile regression. The MNL model

allows us to estimate the correlate of poverty dynamics categories, while the simultaneous quantile regression model examines if the expenditure generating function for the four categories of poverty dynamics differ (Quisumbing 2011). The logit regression of the transient poverty categories serves as a robustness test to the results obtained from the MNL model. Since our data are nationally representative and involve a two-stage sampling method, the estimates are generated using the *svy* prefix command of the STATA 14 statistical programming to account for sampling stratification.

The explanatory variables used in the regressions from the 2011-2012 BIHS data are summarized in Table 13.3. Due to non-response to some questions used to construct the variables—the Women’s Empowerment in Agriculture Index (WEAI) and the share of nonfarm income in total income—the final sample size used in the regressions has been reduced from 5,260 to 4,873.

Table 13.3: Summary Statistics of Variables Used for Analysis, 2011-2012 BIHS Data

Variables	Obs.	Mean	Std. Dev.	Min	Max
Age (in years) of household head	5,260	44.21	13.92	16	102
Household size	5,260	4.23	1.65	1	17
Child dependency ratio (0-18 years)	5,176	0.76	0.71	0	6
Aged dependency ratio (60+ years)	5,176	0.13	0.30	0	3
Categories of average years of education of members 18+ (male)					
No schooling	5,260	0.49	0.50	0	1
Less than primary	5,260	0.26	0.44	0	1
Primary	5,260	0.17	0.38	0	1
Secondary or above	5,260	0.08	0.27	0	1
Categories of average years of education of members 18+ (female)					
No schooling	5,260	0.40	0.49	0	1
Less than primary	5,260	0.35	0.48	0	1
Primary	5,260	0.22	0.41	0	1
Secondary or above	5,260	0.03	0.17	0	1
Value of savings (in thousand BDT)	5,260	7.44	28.09	0	593.71
Value of asset (in thousand BDT)	5,260	19.42	45.60	0	1858.35
ln (household’s owned land+1)	5,260	1.87	2.13	0	7.78

Continued

Continued from Table 13.3

Variables	Obs.	Mean	Std. Dev.	Min	Max
Number of dairy cows owned	5,260	0.48	1.04	0	20
Number of poultry owned	5,260	5.49	31.39	0	1950
Owens a mobile phone; dummy (1=yes, 0=no)	5,260	0.73	0.44	0	1
Access to electricity; dummy (1=yes, 0=no)	5,260	0.46	0.50	0	1
No access to sanitary latrine; dummy (1=yes, 0=no)	5,260	0.03	0.18	0	1
Female-headed household with no living spouse (1=yes, 0=no)	5,260	0.07	0.25	0	1
Receives safety net transfer of BDT 1,000-1,500/month; dummy (1=yes, 0=no)	5,260	0.00	0.07	0	1
Receives safety net transfer of at least BDT 1,500/month; dummy (1=yes, 0=no)	5,260	0.01	0.08	0	1
Share of nonfarm income in total income	5,223	0.62	0.40	0	1
5DE score of WEAI	4,988	0.63	0.19	0	1
Primary female decisionmaker faces domestic violence; dummy (1=yes, 0=no)	5,260	0.34	0.47	0	1
Division dummies					
Barisal	5,260	0.08	0.26	0	1
Chittagong	5,260	0.17	0.38	0	1
Dhaka	5,260	0.31	0.46	0	1
Khulna	5,260	0.10	0.30	0	1
Rajshahi	5,260	0.11	0.31	0	1
Rangpur	5,260	0.10	0.30	0	1
Sylhet	5,260	0.13	0.34	0	1

Source: IFPRI Bangladesh Integrated Household Survey (BIHS), 2011-2012 survey.

Table 13.4 shows results from the MNL model, with the base category as the never poor group of the poverty dynamics categories. As mentioned before, since the coefficients of the MNL regression cannot be interpreted directly, we present the RRR in the tables. The dependent variables in the MNL regression are the four categories of poverty dynamics: always poor, moved out of poverty, fell into poverty, and never poor (base category).

We find that household demographics is an important driver affecting poverty dynamics. Households with older household heads are less likely to fall into poverty and to retain their state of impoverishment. Consistent with findings in other poverty dynamics studies, larger household size and

higher child dependency ratio increase the likelihood of persistent poverty and households are more likely to fall into poverty over time (Quisumbing 2007; Baulch and Dat 2011; Edig and Schwarze 2011). In rural Bangladesh, there is typically one adult earning member in the household—the male household head. Therefore, having many household members, particularly children, strains income.

Table 13.4: Results of the Multinomial Logit Model with Base Equal to “Never Poor”, 2011-2012 to 2015

Variables	Model with base NPNP		
	Always poor	Moved out of poverty	Fell into poverty
	(1)	(2)	(3)
Age (in years) of household head	0.97*** (0.01)	0.99** (0.00)	0.98*** (0.01)
Household size	2.15*** (0.11)	1.62*** (0.07)	1.24*** (0.06)
Child dependency ratio (0-18 years)	1.00*** (0.00)	1.00*** (0.00)	1.00 (0.00)
Aged dependency ratio (60+ years)	1.00** (0.00)	1.00 (0.00)	1.00** (0.00)
Categories of average years of education of members 18+ (male)			
Less than primary	0.67*** (0.10)	0.88 (0.11)	1.00 (0.14)
Primary	0.48*** (0.09)	0.71** (0.12)	0.73* (0.13)
Secondary or above	0.28*** (0.11)	0.48** (0.17)	0.60 (0.20)
Categories of average years of education of members 18+ (female)			
Less than primary	1.00 (0.12)	0.88 (0.10)	0.83 (0.11)
Primary	0.65** (0.12)	0.86 (0.14)	0.73* (0.13)
Secondary or above	0.14* (0.15)	0.64 (0.34)	0.53 (0.25)
Value of savings (in thousand BDT)	0.96*** (0.01)	0.98*** (0.01)	0.99** (0.01)
Value of asset (in thousand BDT)	0.89*** (0.01)	0.94*** (0.01)	0.99 (0.01)
ln (household's owned_land+1)	0.80*** (0.03)	0.86*** (0.03)	0.85*** (0.03)

Continued

Continued from Table 13.4

Variables	Model with base NPNP		
	Always poor	Moved out of poverty	Fell into poverty
	(1)	(2)	(3)
Number of dairy cows owned	0.97 (0.07)	0.86* (0.07)	0.98 (0.07)
Number of poultry owned	0.98* (0.01)	0.99 (0.01)	1.00 (0.01)
Owens a mobile phone; dummy (1=yes, 0=no)	0.35*** (0.04)	0.47*** (0.05)	0.65*** (0.08)
Access to electricity; dummy (1=yes, 0=no)	0.45*** (0.06)	0.67*** (0.08)	0.50*** (0.07)
No access to sanitary latrine; dummy (1=yes, 0=no)	1.64* (0.45)	0.95 (0.29)	1.90** (0.57)
Female headed household with no living spouse (1=yes, 0=no)	1.73** (0.42)	1.96*** (0.42)	1.27 (0.31)
Receives safety net transfer of BDT 1,000-1,500/month; dummy (1=yes, 0=no)	1.56 (0.82)	2.69 (1.74)	1.75 (1.14)
Receives safety net transfer of at least BDT 1,500/month; dummy (1=yes, 0=no)	0.15*** (0.10)	0.39 (0.38)	0.17* (0.16)
Share of nonfarm income in total income	1.00** (0.00)	0.99*** (0.00)	1.00*** (0.00)
Five DE score of WEAI	0.48** (0.16)	0.52** (0.15)	0.89 (0.25)
Primary female decision-maker faces domestic violence; dummy (1=yes, 0=no)	1.30* (0.18)	1.17 (0.16)	1.12 (0.14)
Division dummies included	yes	yes	yes
Constant	0.10*** (0.05)	0.18*** (0.07)	0.59 (0.23)
Observations	4,873	4,873	4,873
F (90, 179)	12.57		
Prob > F	0.00		

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Source: Estimated by authors using data from the IFPRI Bangladesh Integrated Household Survey (BIHS), 2011-2012 and 2015 longitudinal surveys.

Increasing the level of education is vital to sustainable poverty eradication. We find a statistically significant reduction in the likelihood of being chronically poor as the level of education goes up. On average, male household members need to have at least some level of education to decrease the likelihood of

persistent poverty, whereas at least primary level of education is required to prevent falling into poverty over time. For females, at least primary level of education is required to prevent persistent and transitory poverty. Interestingly, for both categories, the estimated RRR values are lower as the level of education goes up, meaning stronger reductions in the likelihood of persistent poverty as educational attainment progresses from primary to secondary level.

All the wealth indicators—value of savings, value of assets, and decimals of owned agricultural land—have a negative association with persistent poverty with savings and owned land, which is particularly important to decrease the likelihood of falling into poverty over time. Wealth or assets cushions households facing adversities, which are essential for mitigating negative shocks. This is particularly important for Bangladesh because of frequent occurrences of natural calamities like flooding in the mainland, and cyclones or hurricanes along the coastal region.

Owning a mobile phone and having access to electricity are statistically significant factors in reducing the likelihood of persistent and transitory poverty. Having access to information on critical issues such as agricultural production techniques and market prices are important for increased farm income. Mobile phones are an avenue to such information. Access to electricity catalyzes rural development, which is beneficial for rural communities. For example, access to electricity has a considerable positive effect on educational attainment and performance of children. Rural electrification not only extends hours of teaching at school but also improved quality of light at home, which allows more time for reading and homework (WB IEG 2008).

Access to a sanitary latrine is vital for hygiene and healthy living, which in turn can facilitate income generation for household members. If households do not have access to sanitary latrine, the likelihood of remaining in persistent poverty is higher, as is the likelihood of falling into poverty over time.

Social safety net transfers, which may include cash or in-kind transfers, can mitigate and protect poor and vulnerable families from economic shocks, natural disasters, and other crises. Our findings show an important aspect of such transfers—the size of safety net transfers matter. There is a statistically significant reduction in the likelihood of households remaining in persistent poverty when households receive safety net transfers of at least BDT 1,500 per month. This transfer amount also decreases the likelihood of households falling into poverty over time. The model was run with various other transfer amounts below BDT 1,500, but we see a statistically significant reduction in persistent and transitory poverty only when a household receives a monthly safety net transfer of at least BDT 1,500 per month.

In many developing countries, the rural economy transforms with more opportunities in the nonfarm sector as agriculture growth slows down due to land constraints and increased labor productivity due to technological innovations (Mellor 2017). Recent studies in Bangladesh show such trends (Nargis and Hossain 2006), with substantial economic diversification taking place in rural areas in the recent past with rural households earning more from nonfarm activities than agriculture due to the low price of farm products and lack of an appropriate marketing system (BBS 2015). Income from agriculture is subject to risks arising from market forces and weather, which can make the households engaged in agriculture vulnerable. This is substantiated by our findings, which show that involvement in the rural nonfarm sector, measured as the share of nonfarm income out of total income, reduces the likelihood of households remaining in or falling into poverty over time.

Our results suggest that women's empowerment is a critical factor in poverty alleviation efforts in rural Bangladesh. We used the Women's Empowerment in Agriculture Index (WEAI) as a measure of empowerment. WEAI is a weighted average of two sub-indices: (1) the five domains of empowerment (5DE), and (2) the Gender Parity Index (GPI). The 5DE sub-index shows how empowered women are, capturing the roles and extent of women's engagement in the agricultural sector in five domains: (1) decisions over agricultural production, (2) access to and decision-making power over productive resources, (3) control over use of income, (4) leadership in the community, and (5) time use (for more information see Alkire et al. 2013). Using the 5DE score of WEAI, we find that an increase in women's empowerment reduces the likelihood of households remaining in persistent poverty.

Not only is women's empowerment vital to poverty alleviation, so is the need to free women from violence and subjugation, and to ensure harmony in the household. Our findings suggest that households where the primary female decision-maker faces domestic violence are more likely to remain in poverty over time, that is, remain persistently poor.

Some of the RRRs of the regressors in the moving out of poverty category (Model 2 in Table 13.4) are difficult to interpret, owing to the counter-intuitive signs of the statistically significant variables. A possible explanation offered by Quisumbing (2011) is that the probabilities associated with the moving up category are conditional probabilities—that is, the probability of being non-poor is now conditional of being poor in the previous round. The resulting RRRs estimated reflects a combination of the likelihood of being non-poor now as well as poor in the previous round.

It is imperative for policymakers and academics to not only look at the factors driving persistent poverty, but also to understand the factors behind transient poverty. In sub-section 13.5.2.1, we look at the two categories of transient poverty—falling into and moving out—in separate logit regressions using the same covariates as was in the MNL.

Furthermore, as noted previously, there exists some degree of arbitrariness as a result of using a poverty cut-off and converting it to a categorical dependent variable (that is, the poverty dynamics variable). Therefore, in sub-section 13.5.2.2, we also look at a continuous dependent variable—per capita expenditure—to elicit the relationship between the regressors and the dependent variable using a simultaneous quantile regression.

13.5.2.1 Determinants of Transient Poverty: Logistic Regression Results

In this section, we separately look at the determinants of the two categories of transient poverty—namely, falling into and moving out of poverty—using a logit regression model. In Table 13.5, we present the elasticity (ey/ex) of the regressors against the dependent variable. This enables us to estimate the magnitude of the effect on transient poverty category for 1 percent change in the value of the regressors. All the results in the logit regression are consistent with findings from the MNL regression.

Older household head, smaller household size, lower dependency ratio, and higher savings and assets tend to prevent households from falling into poverty. Households with adult males and females who have completed at least primary education are 6 percent and 7 percent more likely not to fall into poverty, respectively. Households owning a mobile phone and having access to electricity are 31 percent and 36 percent less likely to fall into poverty, respectively. Receiving a social safety net transfer of at least BDT 1,500 per month and involvement in the rural nonfarm sectors are also found to be significant in preventing households from falling into poverty. Households who have some share of income coming from the nonfarm sector are 25 percent less likely to fall into poverty.

Next, for households that have moved out of poverty, education is again found to be a crucial factor for this graduation. At least primary level of education for adult male and secondary or more education for adult female members of the household help households move out of poverty. Higher levels of savings, assets, and agricultural landholding have statistically significant positive association with movement out of poverty. Moreover, owning a mobile phone and access to electricity increases the likelihood of moving out of poverty by 9 percent and 4 percent, respectively.

Table 13.5: Logit Regression of Transient Poverty Categories, 2011-2012 to 2015

Variables	Marginal effects (ey/ex)	
	Fell into poverty	Moved out of poverty
	(1)	(2)
Age (in years) of household head	-0.68*** (0.21)	0.35** (0.14)
Household size	0.67*** (0.16)	-0.76*** (0.15)
Child dependency ratio (0-18 years)	0.05 (0.05)	0.02 (0.05)
Aged dependency ratio (60+ years)	0.05** (0.02)	-0.02 (0.01)
Categories of average years of education of members 18+ (male)		
Less than primary	-0.00 (0.03)	0.04** (0.02)
Primary	-0.06* (0.03)	0.01* (0.01)
Secondary or above	-0.06* (0.04)	0.00 (0.00)
Categories of average years of education of members 18+ (female)		
Less than primary	-0.06 (0.04)	-0.02 (0.03)
Primary	-0.07* (0.04)	0.01 (0.01)
Secondary or above	-0.03 (0.02)	0.00*** (0.00)
Value of savings (in thousand BDT)	-0.13** (0.06)	0.01** (0.01)
Value of asset (in thousand BDT)	-0.24 (0.21)	0.10*** (0.02)
ln (household's owned_land+1)	-0.33*** (0.07)	0.04* (0.02)
Number of dairy cows owned	-0.01 (0.04)	-0.03 (0.02)
Number of poultry owned	-0.01 (0.03)	0.02 (0.02)
Owens a mobile phone; dummy (1=yes, 0=no)	-0.31*** (0.09)	0.09*** (0.03)
Access to electricity; dummy (1=yes, 0=no)	-0.36*** (0.07)	0.04*** (0.02)

Continued

Continued from Table 13.5

Variables	Marginal effects (ey/ex)	
	Fell into poverty	Moved out of poverty
	(1)	(2)
No access to sanitary latrine; dummy (1=yes, 0=no)	0.01** (0.00)	-0.02* (0.01)
Female headed household with no living spouse; dummy (1=yes, 0=no)	0.01 (0.01)	0.00 (0.01)
Receives safety net transfer of BDT 1,000-1,500/month; dummy (1=yes, 0=no)	0.00 (0.00)	0.00 (0.00)
Receives safety net transfer of at least BDT 1,500/month; dummy (1=yes, 0=no)	-0.01* (0.01)	0.00** (0.00)
Share of nonfarm income in total income	-0.25*** (0.08)	-0.03 (0.04)
5DE score of WEAI	-0.07 (0.16)	0.05 (0.11)
Primary female decision-maker faces domestic violence; dummy (1=yes, 0=no)	0.03 (0.03)	-0.02 (0.03)
Division dummies included	yes	yes
Observations	3,481	1,392
F statistics	F (30,239)=12.57	F (30,227)=5.16
Prob > F	0.00	0.00

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Source: Estimated by authors using data from the IFPRI Bangladesh Integrated Household Survey (BIHS), 2011-2012 and 2015 longitudinal surveys.

13.5.2.2 Determinants of Log Per Capita Expenditure: Simultaneous Quantile Regression

Table 13.6 shows the simultaneous quantile regression estimates using the logarithm of per capita expenditure in 2011-2012 calibrated to the 11th, 15th, 44th and 67th percentiles of the expenditure distribution, which are the mean expenditures of the persistently poor, falling into poverty, moving out of poverty, and never poor categories, respectively. Additionally, we estimate an interquartile regression for the difference between coefficients at the 11th and 67th percentile of the expenditure distribution—that is, percentiles corresponding to the persistently poor and never poor categories. As before, to avoid endogeneity, all the regressors are from the first survey round (2011-2012 BIHS).

Table 13.6: Simultaneous Quantile Regression Estimates of Log Per Capita Expenditure in 2015

Variables	Persistently poor (11th percentile)		Fell into poverty (15th percentile)		Moved out of poverty (44th percentile)		Never poor (67th percentile)		Inter-quantile regression
Age (in years) of household head	0.23*** (0.05)	0.23*** (0.05)	0.43*** (0.06)	0.43*** (0.06)	0.63*** (0.09)	0.63*** (0.09)	0.40*** (0.09)	0.40*** (0.09)	0.40*** (0.09)
Household size	-3.31*** (0.44)	-3.27*** (0.52)	-6.40*** (0.50)	-6.40*** (0.50)	-9.00*** (0.66)	-9.00*** (0.66)	-5.69*** (0.72)	-5.69*** (0.72)	-5.69*** (0.72)
Child dependency ratio (0-18 years)	-0.02 (0.01)	-0.02* (0.01)	-0.03*** (0.01)	-0.03*** (0.01)	-0.03* (0.01)	-0.03* (0.01)	-0.01 (0.02)	-0.01 (0.02)	-0.01 (0.02)
Aged dependency ratio (60+ years)	-0.05** (0.02)	-0.05** (0.02)	-0.08*** (0.03)	-0.08*** (0.03)	-0.06* (0.04)	-0.06* (0.04)	-0.01 (0.04)	-0.01 (0.04)	-0.01 (0.04)
Categories of average years of education of members 18+ (male)									
Less than primary	0.59 (1.17)	1.24 (1.24)	-3.18** (1.62)	-3.18** (1.62)	-2.73 (2.27)	-2.73 (2.27)	-3.32 (2.28)	-3.32 (2.28)	-3.32 (2.28)
Primary	1.52 (1.96)	3.35 (2.32)	-0.32 (1.84)	-0.32 (1.84)	-1.73 (2.65)	-1.73 (2.65)	-3.25 (2.97)	-3.25 (2.97)	-3.25 (2.97)
Secondary or above	9.97*** (3.20)	12.81*** (3.40)	11.68*** (4.28)	11.68*** (4.28)	9.78* (5.71)	9.78* (5.71)	-0.19 (6.03)	-0.19 (6.03)	-0.19 (6.03)
Categories of average years of education of members 18+ (female)									
Less than primary	2.47** (1.11)	2.66** (1.22)	1.78 (1.53)	1.78 (1.53)	2.82 (2.08)	2.82 (2.08)	0.35 (2.16)	0.35 (2.16)	0.35 (2.16)
Primary	6.65*** (1.78)	7.06*** (1.77)	8.98*** (1.97)	8.98*** (1.97)	11.75*** (3.09)	11.75*** (3.09)	5.10 (3.23)	5.10 (3.23)	5.10 (3.23)

Continued

Continued from Table 13.6

Variables	Persistently poor	Fell into poverty	Moved out of poverty	Never poor	Inter-quantile regression
	(11th percentile)	(15th percentile)	(44th percentile)	(67th percentile)	
Secondary or above	18.12*** (3.87)	17.82*** (4.15)	16.37*** (6.48)	30.27*** (11.56)	12.14 (11.76)
Value of savings (in thousand BDT)	0.19*** (0.03)	0.19*** (0.03)	0.24*** (0.04)	0.26*** (0.08)	0.08 (0.08)
Value of asset (in thousand BDT)	0.10** (0.05)	0.12** (0.05)	0.34*** (0.07)	0.50*** (0.08)	0.40*** (0.06)
In (household's owned land+1)	2.56*** (0.32)	2.66*** (0.38)	2.89*** (0.38)	2.96*** (0.53)	0.40 (0.54)
Number of dairy cows owned	0.05 (0.64)	0.17 (0.74)	1.28** (0.60)	2.00** (0.95)	1.95* (1.02)
Number of poultry owned	0.01 (0.05)	0.01 (0.05)	0.00 (0.06)	-0.04 (0.10)	-0.05 (0.07)
Owens a mobile phone; dummy (1=yes, 0=no)	6.71*** (1.11)	7.16*** (1.17)	12.70*** (1.42)	17.16*** (1.89)	10.45*** (2.04)
Access to electricity; dummy (1=yes, 0=no)	7.04*** (1.15)	7.70*** (1.43)	11.76*** (1.41)	16.38*** (1.99)	9.34*** (2.07)
No access to sanitary latrine; dummy (1=yes, 0=no)	-4.46* (2.46)	-4.89** (2.43)	-8.13*** (2.56)	-5.68 (4.04)	-1.22 (4.19)
Female headed household with no living spouse; dummy (1=yes, 0=no)	-2.58 (2.05)	-3.39 (2.07)	-6.51** (3.26)	-2.89 (4.39)	-0.31 (4.57)

Continued

Continued from Table 1.3.6

Variables	Persistently poor		Fell into poverty		Moved out of poverty		Never poor		Inter-quantile regression
	(11th percentile)	(15th percentile)	(44th percentile)	(67th percentile)	(67th percentile)	(67th percentile)	(67th percentile)		
Receives safety net transfer of BDT 1,000-1,500/month; dummy (1=yes, 0=no)	-2.38 (5.08)	-4.53 (4.84)	-5.41 (6.74)	-14.12 (10.26)	-11.74 (10.61)				
Receives safety net transfer of at least BDT 1,500/month; dummy (1=yes, 0=no)	13.83** (6.66)	9.22* (5.26)	2.04 (5.29)	-4.02 (9.12)	-17.85* (9.97)				
Share of nonfarm income in total income	0.03** (0.01)	0.03** (0.01)	0.07*** (0.02)	0.12*** (0.02)	0.09*** (0.02)				
5DE score of WEAI	4.58* (2.51)	4.42 (2.99)	5.76* (3.17)	6.05 (4.33)	1.47 (4.65)				
Primary female decision maker faces domestic violence; dummy (1=yes, 0=no)	-1.94 (1.23)	-2.09* (1.21)	-4.18*** (1.33)	-5.80*** (1.81)	-3.86** (1.92)				
Constant	52.39*** (3.53)	55.90*** (3.64)	81.74*** (3.93)	96.44*** (5.55)	44.05*** (5.63)				
Division dummies included	yes	yes	yes	yes	yes				
Observations	4,873	4,873	4,873	4,873	4,873				
Pseudo R-squared	0.13	0.13	0.19	0.22	-				

Note: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Source: Estimated by authors using data from the IFPRI Bangladesh Integrated Household Survey (BIHS), 2011-2012 and 2015 longitudinal surveys.

All the results from the simultaneous quantile regressions are consistent with the results obtained from the MNL and the logit regressions. The comparison of the results across the three models indicates that the findings of the poverty dynamics study are robust.

The results of the interquartile regression indicate that age of household head, household size, value of assets, number of dairy cows owned, ownership of mobile phone, access to electricity, receiving a safety net transfer of at least BDT 1,500 per month, share of nonfarm income out of total income, and domestic violence have statistically significant differences of responsiveness between persistently poor and never poor categories. For example, household size has a greater expenditure depressing effect for the never poor than for the persistently poor, maybe because household members in poor families, even children, are likely to be engaged in various income-generating activities. The cost of education for children in well-off households is also reflected here (Kumar 2015).

13.6 Summary and Policy Implications

Using panel data from the BIHS 2011-2012 and 2015, this paper analyses poverty dynamics in rural Bangladesh. Results of the descriptive analysis suggest that a substantial share of the rural population (16.6 percent) are trapped in persistent poverty (average consumption over time is below the poverty line) over the two rounds of the survey. There is also evidence of considerable churning between the categories, with 15.5 percent of the population moving out of poverty and 9.4 percent falling into poverty.

We estimated different regression models to analyze the correlates of persistent and transient poverty in rural Bangladesh. Using the multinomial logit model, we find that households with low levels of education, savings, physical assets, lack of access to electricity and mobile phones, no engagement in nonfarm sector, not receiving safety net transfers of at least BDT 1,500 per month, and higher levels of women's disempowerment are more likely to be persistently poor. Initial conditions such as larger household size, higher proportion of dependent members compared to working age members, and a younger household head are also associated with persistent poverty.

For transient poverty, a larger household size with more dependents, low level of human and physical assets, lack of savings, no access to mobile phones and electricity, and small size of safety net transfers (that is, less than BDT 1,500 per month) increase the likelihood that households will fall into poverty *and* prevent households from moving out of poverty. Engagement in the nonfarm sector is important in preventing households

from falling into poverty. These results are consistent across the models estimated in this paper.

Our results point to some important areas for policy intervention. First, similar to findings in other poverty dynamics studies in Bangladesh and other countries, education is critical to sustaining poverty reduction, providing a base to not only break out of persistent poverty, but also to prevent sliding back into it. Higher levels of education, at least to the secondary level, and educating female members of the household are particularly essential for poverty reduction. Quality education enables greater access to salaried jobs in the formal sector and creates opportunities for women to engage in income-generating activities. Given the strength of relationships between poverty and education, investments in children's schooling may determine whether they will be poor in the future. Numerous studies in Bangladesh and elsewhere provide evidence that conditional cash or food transfer programs effectively promote school attendance of children from poor families. Continued emphasis needs to be on such programs, along with preventing dropouts and improving the quality of education through effective teachers' training, especially in rural areas. Because the real value of cash transfers has been depleting over time, the effectiveness of education incentive interventions such as primary and secondary education stipend programs in enticing children from poor households to school and retaining them in school should be evaluated. Moreover, the transfer amount should be determined on the basis of estimates of education costs for the poor (direct, indirect, and opportunity costs) for different grade levels and for boys and girls.

Second, our results show that higher levels of savings and physical assets help households move out of poverty and prevent them from falling into poverty. However, the poor have the thinnest asset base and it is very difficult for them to accumulate enough savings to invest in physical assets and enter new activities with higher returns. Interventions to aid savings could require safety net participants to deposit a portion of cash transfers into mandatory savings funds. Research has shown that asset transfers by BRAC's Targeted Ultra Poor program led to sustained food security and livelihood improvements (Ahmed, Rabbani, Sulaiman, and Das 2009). Similar asset transfer programs include the Char Livelihoods Project and SHOUHARDO. However, asset transfer programs tend to be much more costly than other safety net programs; therefore, the apparent trade-off between program coverage and sustainability needs to be carefully addressed. Given the encouraging results, these programs can be scaled up in economically lagging and disaster-prone regions.

Third, we find that an increased share of nonfarm income out of total income enables households to break out of persistent poverty and prevents them from falling back into poverty. Promoting rural nonfarm employment through agriculture-driven nonfarm activities (for example, vocational training in repairs and servicing of agricultural machineries, particularly for rural youth) and strengthening agricultural value chains to gainfully employ rural youth (for example, in packaging and transport) hold promise. The Government of Bangladesh recognizes this and has prioritized strengthening support for nonfarm job creation, rural mobility, and infrastructure in the Seventh Five Year Plan (GED 2015a). In Bangladesh, the capacity to absorb the growing rural labor force in agriculture is very limited since there are land constraints holding back expansion. Further, the growth of crop production now depends almost entirely on technological progress, resulting in low employment response of increased output. Therefore, a shift of rural labor force out of agriculture, accompanied by faster agricultural growth, are key for boosting rural incomes.

Fourth, rural infrastructure development is crucial for sustained poverty eradication. Access to mobile phones and electricity are important determinants of all four poverty dynamics categories. Access to a mobile phone is a gateway to essential information and services. New information and knowledge are critical inputs for improved agricultural practices and marketing of agricultural products. Mobile phone technology holds great promise in delivering information to resource-poor farmers and thereby integrating them into agricultural value chains. Clear policies need to be formulated that account for the critical role of the private sector in this context.

Access to electricity is a composite indicator of development. In addition to being an indicator of wealth, an electricity connection also indicates the extent to which a household is “connected” in a broader sense to roads, markets, and communications infrastructure (information technology in particular), and the resulting income-earning opportunities. Access to electricity leads to the use of radio, television, and other appliances. Besides being used for entertainment, radio and television are major sources of information for the poor, particularly for illiterate people.

Fifth, our analysis suggests that the size of social safety net transfers matter—the transfer amount needs to be at least BDT 1,500 (about \$18) per month to break persistent poverty or prevent households from falling into poverty. This amount accounted for about one-fourth of total consumption expenditure of the poorest 20 percent of all rural households in the 2011-2012

BIHS sample. The average size of various safety net transfers in Bangladesh is quite small and has been falling in real terms, an issue that is recognized in the National Social Security Strategy (NSSS) of the Government of Bangladesh (GED 2015b). Using a randomized control trial on a sample of the ultra-poor in Bangladesh, Ahmed, Rabbani, Sulaiman, and Das (2016) found that a cash transfer of BDT 1,500 per month combined with nutrition behavior change communication, improved the recipients' nutrition, health, and overall well-being.

Finally, the role of social norms and values is important when addressing poverty alleviation. We find that when women are empowered and face less violence at home, households are more likely to move out of persistent poverty. Engagement of women in productive activities helps increase household income and, as a result, households are better able to withstand shocks and other vulnerabilities. Thus, policies and social campaigns need to be in place to promote gender sensitization and prevent violence against women. While programs specifically designed to address gender dynamics are important, addressing the many determinants of violence requires a broader approach and an openness to discovering relationships, patterns, and solutions in seemingly extraneous places. For example, a randomized controlled trial in Bangladesh targeting mothers of young children found that safety net transfers combined with intensive nutrition behavior change communication reduced intimate partner violence by 26 percent—an unintended, yet positive consequence of a program primarily focused on improving household food security and child nutrition (Roy et al. 2017). Thus, empowering and safeguarding women from violence is not only a moral imperative, but evidence clearly indicates that it is a common-sense approach to accelerating poverty reduction and achieving complementary development goals in Bangladesh.

IFPRI research in Bangladesh, using data from the BIHS, reveals that women's empowerment plays a key role in improving household food security and dietary diversity of children, women, and other household members (Sraboni, Malapit, Quisumbing, and Ahmed 2014; Malapit, Sraboni, Quisumbing, and Ahmed 2015). Therefore, promoting women's empowerment should remain paramount in the policy arena.

In conclusion, Bangladesh has made considerable progress in lowering the rate of poverty in the last decade. However, poverty alleviation strategies should be multifaceted to deal with the interlinked factors affecting vulnerability and impoverishment in the country. A new generation of interventions for sustainable poverty alleviation needs to be in place that

will not only deal with building the human and physical capital of the poor, but would also play a transformative role in development which will provide access to new forms of employment, have broad-based investments in education and effective social safety net policies, and will also change social norms and institutions.

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