Poverty transitions, shocks, and consumption in rural Bangladesh: Preliminary results from a longitudinal household survey

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Abstract

This paper examines the correlates of poverty transitions and consumption per capita, using a new longitudinal data set from Bangladesh. It first examines the determinants of poverty transition categories (chronic poor, never poor, falling into poverty, moving out of poverty) as a function of household characteristics in the original survey round and shocks experienced by the household, controlling for unobserved community characteristics. The probability of being chronically poor (never poor) is negatively (positively) associated with years of schooling of the household head, the value of nonland assets, and the proportion of children below 15 and adults 55 and older in the baseline survey. However, the responsiveness of log per capita consumption does not differ significantly across the four poverty transition categories. Regressions on log per capita consumption also show that per capita consumption increases with years of schooling and assets. Higher proportions of children and older people are also significantly associated with lower per capita consumption, pointing to the importance of life-cycle and demographic factors in the creation and transmission of poverty. Having older household members also makes the household vulnerable to shocks such as illness, death, and property division. Illness shocks—in particular, the income foregone when an income earner falls ill—are important contributors to poverty. The impact of these and other shocks—such as dowry and wedding expenses, floods, and legal costs—in reducing consumption is shown to depend on the amount of land and assets owned by the household together with the schooling of the household head.

1. Introduction

What factors contribute to sustainable poverty reduction? This question interests researchers and policymakers alike, particularly in Bangladesh, which has posted a marked reduction in poverty incidence in the past ten years. Bangladesh's progress in economic growth contributed to a modest reduction in the headcount poverty rate of around 1.5 percentage points a year since the early 1990s.[1] While changing methodologies for data collection have made it difficult to make comparable assessments over time (Ahmed 2000), comparisons of poverty rates between 1995/96 and 2005, when consistent poverty estimation methodologies were used, showed that the poverty headcount declined by only about 2 percent between 1995/96 and 2000, but a significant decline of nearly 9 percentage points occurred in the first half of the 2000s.[2] Between 2000 and 2005, the percentage of the population living in poverty fell from 48.9 percent in 2000 to 40.0 percent in 2005 (BBS 2006). More importantly, there have been substantial improvements in the livelihoods of the poorest of the poor during the period 2000-2005, as the decline in the incidence of extreme poverty and the distributionally sensitive poverty measures (the poverty gap and the squared poverty gap) reveal. These improvements are likely to be the impact of the relatively high economic growth performance in the recent years.

Nevertheless, poverty remains a key challenge as the overall incidence of poverty persists at a high level. The most startling consequence of widespread poverty is that a quarter (25.5 percent) of the country's population—36 million people—cannot afford an adequate diet, according to the 2005 estimates of food poverty or extreme poverty (BBS 2006). In order to design appropriate anti-poverty interventions, researchers and policymakers alike need to understand the factors that enable some households and communities to move out of poverty, while others remain trapped in it. While nationally

[1] This introduction draws heavily from Ahmed, Quisumbing, and Hoddinott (2007). In the period 1986-1996, GDP grew at 4.2 percent annually on average. A higher average annual growth rate of 5.4 percent in 1996-2006, coupled with a decline in the population growth rate, has led a near-doubling of annual per capita GDP growth from 1.8 percent in 1986-1996 to 3.4 percent in 1996-2006. In 2006, Bangladesh achieved a remarkable 6.7 percent GDP growth, up from 6.0 percent in 2005. Per capita GDP increased by 4.8 percent in 2006 (World Bank 2006).

[2] Although the Bangladesh Bureau of Statistics' household income and expenditure survey (HIES) remains the standard time-series microdata on which analysts base their poverty estimates, the methodology has changed for data collection (a switch from seven-day recall to daily diaries in 1983/84) and poverty estimation (from the direct calorie intake method to the cost of basic needs method in 1995/96) (Ahmed 2000).

representative data sets like the HIES provide the snap-shots at the country-wide level, longitudinal microdata sets allow us to look more deeply into factors at the individual, household, and community level that contribute to poverty reduction.

This paper is a preliminary exploration into the factors explaining poverty transitions and levels of per capita consumption using a newly collected longitudinal data set from rural Bangladesh. For the last 18 months, the International Food Policy Research Institute (IFPRI) and the Chronic Poverty Research Centre (CPRC), together with Bangladeshi collaborators Data Analysis and Technical Assistance Ltd. (DATA) and Peter Davis from the University of Bath, have been working on a longitudinal study of 1787 core households in 102 villages in rural Bangladesh. This ongoing study seeks to understand how living standards of households have changed over a six to twelve year period and which factors, institutions and processes have trapped certain households in chronic poverty while allowing others to escape from it. The longitudinal study is itself based on evaluations previously conducted by IFPRI in Bangladesh on microfinance (1994), the micronutrient and gender impact of new agricultural technologies (1996-97) and of food and cash transfers for education (2000 and 2003). Two out of three phases of the longitudinal study have recently been completed, and the third phase is nearing completion. Since not all the data has cleaned and analyzed, the analysis in this paper is preliminary.

This paper examines the correlates of poverty transitions and consumption per capita, using available data from the IFPRI-CPRC-DATA longitudinal survey. It first examines the determinants of poverty transition categories (chronic poor, never poor, falling into poverty, moving out of poverty) as a function of household characteristics in the original survey round and shocks experienced by the household, controlling for unobserved community characteristics. It then estimates quantile regressions on log per capita expenditures, for quantiles corresponding to the mean of each poverty transition category. Then, it examines whether the impact of shocks on per capita consumption differs significantly depending on household characteristics such as land ownership, years of schooling of the household head, and asset ownership.

2. Survey design and data

Survey design

The longitudinal study on which this study is based builds on three surveys conducted by IFPRI in Bangladesh to evaluate the short-term impacts of microfinance, new vegetable and polyculture fish technologies, and the introduction of educational transfers. These are described in Zeller et al. (2001), Bouis et al. (1998), Quisumbing and Maluccio (2003) and Ahmed and Arends-Kuenning (2006), respectively.

The original evaluations surveyed 1787 households and 102 villages located in 14 of Bangladesh's 64 districts. These districts and villages were selected to span the range of agro-ecological conditions found in rural Bangladesh and, while the sample cannot be described as representative in a statistical sense, it does broadly characterize the variability of livelihoods found in rural Bangladesh.

In designing the original evaluation surveys, careful attention was paid to establishing both intervention and comparison/control groups so that single difference estimates of short-term project impact could be derived. For both the agricultural technology and the educational transfers evaluations, villages (unions) were randomly selected to include those with and without the intervention. For the agricultural technologies evaluation an equal number of households were interviewed in villages which had and had not benefited from the dissemination of three different technologies (improved vegetables, group fishponds, and individual fishponds). Both NGO and non-NGO members were surveyed in these villages. For the educational transfers evaluation, twice as many households were selected from food-for-education (FFE) than from non-FFE unions (sub-districts). To better understand the short-term impact of such conditional transfers, questionnaires were also administered at the school level and interviews of school administrators and officials undertaken. In both the agricultural technology and educational transfers studies, households were randomly selected from the relevant sampling frames and strata. For the microfinance evaluation, seven villages were chosen that had NGO microfinance programs operating simultaneously within the villages. Program and control households were then sampled according to landholding strata. Table 1 summarizes the sample for each of the three types of interventions

included in the original evaluation surveys, and lists the number of program and control households.

Since these evaluation surveys were conducted, the sample households have been re-surveyed on one or more occasions. In order to obtain information on micronutrient deficiencies, the agricultural technology households were surveyed on four occasions between 1996 and 1997. Then, in 2000, IFPRI and DATA conducted a follow-up study in one of the three agricultural technology sites (Saturia, in Manikganj district) as part of a study on linkages between agriculture, nutrition, and women's status, and all sites were visited as part of a separate study evaluating the social impact of the agricultural technologies (Hallman et al. 2007). In 2003, a follow-up study was conducted in 8 of the 10 educational transfer villages, as a part of a wider evaluation of the shift from food to cash for education. Finally, in 2006, IFPRI, DATA and the Chronic Poverty Research Centre (CPRC) began a major project to resurvey all the households surveyed in each of the three evaluations. While the focus of this study was on understanding of the drivers and maintainers of chronic poverty in rural Bangladesh, the intervention-comparison groups were maintained from the previous study. In addition, children who had left the original household and set-up their own households were tracked as long as they had not migrated from their district.

The IFPRI-CRPC resurvey involved both qualitative fieldwork and a follow-up longitudinal survey of households included in the IFPRI studies, and consists of three sequenced and integrated phases:

Phase I was a qualitative phase designed to examine perceptions of changes (and why these have come about) from women and men in a subsample of our survey communities. This phase involve single-sex focus group discussions to elicit perceptions of changes, their perceptions of the interventions under study, and the degree to which these interventions affected people's lives (compared to other events in the community). A total of 116 single-sex focus group discussions in 11 districts of Bangladesh, evenly divided between treatment and control villages, were conducted in June-July 2006. Results from preliminary analysis of the FGDs are found in Davis (2007).

Phase II was a quantitative survey of the original households and household "splits" that have formed new households in the same district. The household survey took place from November 2006-March 2007, coinciding roughly with the same

agricultural season as the original survey (or one of its survey rounds), and covered 2,152 households, of which 1,787 were core households that took part in the original survey, and 365 are "splits" from the original household. The household survey questionnaire was designed to be comparable across sites and also to facilitate comparability with the original questionnaire from the evaluation studies. Key variables collected were food and nonfood expenditures, transfers and social assistance received, assets, educational attainment of children, shocks, perceptions of well-being, and anthropometry of all household members. A community level questionnaire was also administered to key informants at this stage to obtain basic information on each village and changes in the community and important institutions within the community since the last survey round. GPS coordinates for all sample households and village facilities were also collected so that we can use spatially referenced databases for Bangladesh. Data entry has been completed; however, for this paper, we use only those modules that have been encoded as of July 2007.[3]

Table 2 presents the distribution of survey households, showing the number of households that attrited, the number that were successfully traced, and the number of new households (or "splits") in the same district. About 93.7 percent of original households were reinterviewed, implying an overall attrition rate of 6.3 percent between the baseline and the 2007 survey round. Attrition rates across survey sites differ, with a low attrition rate of 4 percent in the improved vegetables site to 11.1 percent in the individual fishponds site. Nevertheless, attrition per year is relatively low, ranging from 0.4 percent per year in the agricultural technology site to a maximum of 2 percent per year in the educational transfers site—an average of 0.8 percent per year across all sites. Our attrition rates compare quite favorably to the longitudinal data sets reviewed in Alderman et al. (2001), where attrition rates range from 6 to 50 percent between two survey rounds

[3] This paper is based on the household roster, food expenditure, nonfood expenditure, and shocks modules from the 2007 survey. In addition to these modules, data were also collected on migration, schooling costs and attendance, employment, social assistance, net income from agriculture, access to facilities, assets, land ownership and sales of land in the last 10 years, housing and sanitation, perceptions of poverty and well-being, health status and morbidity (for all household members), anthropometry (collected for all household members), group membership, social networks, and family background (collected separately for household head and spouse). In the agricultural technology households, additional modules on agricultural production and nonfarm income sources and 24-hour individual food recall were also administered, and hemoglobin status of children under 5 and females up to age 65 collected using the finger-pinprick method via Hemocue. A community questionnaire was also administered in all survey villages. Most of these modules have been encoded, but data cleaning and variable construction are still ongoing.

and 1.5 to 23.2 percent per year between survey rounds. The survey that had the lowest attrition rate per year, the Indonesia Family Life Survey (Thomas, Frankenberg, and Smith 2001), which reported a rate of 1.5 percent per year, devoted substantial resources to tracking migrants. [4] While we did not have the resources to track all splits that had migrated to other districts, we obtained names and addresses of migrants from their parents or neighbors. All in all, we were able to track and interview 75 percent of household splits. We analyze the determinants of attrition in Section 2.2

Phase III consists of a qualitative study based on life histories of 140 selected households, focusing on the years between the original survey and the most recent survey. Households to be interviewed have been stratified by intervention, and then selected based on the four cells of the poverty transition matrix (poor in both waves, moving into poverty, moving out of poverty, and not poor in both waves). Semi-structured interviews are being conducted using life-history methods and visualization techniques by a small team of experienced Bengali-speaking researchers to understand the processes and institutional contexts which influence livelihood trajectories. All interviews are being digitally recorded, and will be transcribed and translated for subsequent analysis using nVivo. Field work for this final phase will be complete by the end of October 2007.

Determinants of attrition

Table 3 examines the determinants of attrition between the reference survey round in the previous surveys and the 2006/2007 round, separately for each study site. Because the microfinance and agricultural technology surveys took place over several rounds in an agricultural year, the "reference round" refers to the round that matches the month (and season) of the 2006/2007 most closely. This corresponded to the third round in the microfinance survey and the second and third rounds of the agricultural technology survey. Because poverty comparisons rely critically on having consumption data from two points in time, our definition of sample attrition does not rely simply on whether the household was recontacted or not. Rather, we define an attritor as a household with a nonmissing consumption estimate in the reference survey round and a missing

[4] Attrition rates between the 1999 and 2004 rounds of the Ethiopian Rural Household Survey are also low. Among households in villages receiving food aid, the overall attrition rate was low, 6.5 percent or 1.3 percent per year (Gilligan and Hoddinott 2007).

consumption estimate in the 2006/2007 survey round. We posit that the probability of attrition depends on household characteristics, unobservable locational characteristics, and past interview quality. Following Maluccio (2004), our measure of past interview quality is the village-specific attrition rate in the past survey rounds.

Probit regression results (see Table 3) on the determinants of attrition clearly show that attrition, while low, is nonrandom. In the microfinance sites, households whose heads were better-educated, households with less assets, and households with a higher proportion of individuals older than age 55 were more likely to leave the sample. In the agricultural technology sites, households with a larger proportion of persons older than age 55 were also more likely to leave the sample. Interestingly, in the educational transfers sites, households with older household heads were less likely to leave the sample, and households with higher proportions of members between 5-14 years of age were less likely to attrit, possibly because this is the age group that benefits from educational transfer programs. Past interview quality affected attrition in the microfinance and educational transfers sites, although in different ways. Households in the microfinance sites were less likely to attrit in villages with higher between-round attrition rates in the 1994/1995 surveys. In the educational transfers sites households in villages with higher attrition rates between 2000 and 2003 were more likely to leave the sample.. Unobserved locational effects are clearly important determinants of attrition. Households in Manikganj district are significantly less likely to leave the microfinance sample and the agricultural technology sample (although it is the excluded category in the agricultural technology attrition regressions, the dummy variables for the other sites are all negative and significant). This probably reflects the ease of interviewing in Manikganj, which is close to Dhaka, and where NGOs have been working for a long time. In contrast, the two thanas in the individual fishpond sites, which are traditionally more conservative, have much higher attrition rates. Relative to the Nilphamari site, and controlling for village-level attrition in the past, households in all other educational transfers sites are significantly more likely to leave the sample.

Consistent with the above results, coefficients on demographic categories are jointly significant in the agricultural technology and educational transfers sites, while coefficients on the locational dummies are jointly significant in all the sites. In this

version of the paper, we do not correct our estimates for the possibility of attrition bias, but leave that for future work.

Household characteristics and shocks

Table 4 presents per capita consumption expenditures, poverty transition categories, and household characteristics of core households as of the first round of the original survey. All monetary values are in 2007 taka, converted using the CPI. The consumption variable is constructed in the following fashion. Food and nonfood consumption were covered in separate modules in the questionnaire. For each food item, households were asked about the amounts they had consumed out of purchases, out of own production, and from other sources (including wages, gifts, government programs, and begging) in the last week.[5] In general, these consumption levels are valued using prices obtained from local market surveys fielded at the same time as the household survey. Nonfood items include both consumables such as matches, batteries, soap, kerosene and the like, clothing, education, and transport. We also include local property taxes, since public goods provision is often linked to local taxes (Deaton and Zaidi 2002), and zakat, which is linked to wealth, but is voluntary in Bangladesh.

Following current best practice in computing consumption expenditures from household surveys (Deaton and Zaidi 2002), our expenditure aggregate *excludes* the following: (1) dowry, wedding, pilgrimage (Haj), and funeral costs, which tend to be lumpy expenditures financed out of savings (or asset disposal); (2) durable goods (appliances, means of transportation), housing, and housing repairs; (3) health and medical expenditures; and (4) costs of legal and court cases. Most of these expenditure categories are "lumpy," infrequent expenditures; in related work by Baulch and Davis (2007) on the same data set, these expenditures are linked to a decline in well-being. While wedding expenses could be treated as current expenditures (similar to parties and feasts), dowries have often been interpreted as "female inheritance" or a form of intergenerational transfer (Botticini and Siow 2003) that technically does not count as consumption. In the Bangladeshi context, as in other parts of South Asia, because dowries may not be under the bride's direct control, and are subject to considerable inter-familial bargaining, which may escalate into domestic violence (Bloch and Rao 2002), it

[5] Respondents were first asked whether they consumed the item in the last three days, and if not, in the last seven days.

is not clear whether dowry expenditures contribute to well-being, for which consumption expenditures are a proxy. Medical expenditures are excluded following Deaton and Zaidi's (2002) recommendation to exclude health expenses in countries where the elasticity of health expenditure with respect to total expenditure is low, and also because health expenditures are often a "regrettable necessity" (p. 32) that does not increase household welfare. Since most houses are owner-occupied or constructed, it was difficult to impute a rental value of housing. Although a very small percentage of households reported housing and land rentals, these numbers were very large and were clear outliers, and could have reflected renting a space for business or simply land rent. Because jewelry is regarded as an important asset for women to accumulate in Bangladesh, expenditures on jewelry—which also tend to be lumpy--are also not included in the consumption aggregate. Different recall periods were used for different items; for comparability all are changed into monthly (30-day) consumption and expressed in per capita terms. Poverty incidence was then computed by comparing the per capita poverty line with the relevant area-specific poverty lines for the original survey round and for 2006/2007 based on the area-specific upper HIES-2005 poverty line, deflated back to the original survey years as needed (BBS 2006).[6]

While this data set is not nationally representative, comparisons of per capita consumption and poverty in the baseline survey and in 2006/2007 show definite increases in per capita consumption, and impressive reductions in poverty. In the microfinance site, the earliest site to be surveyed, the percentage of households in poverty declined from 60 percent in 1994 to 21 percent in 2006/2007, a reduction of 3.25 percentage points per year. In the agricultural technology sites, poverty incidence declined from 70 percent in 1996 to 18 percent in 2006/2007 (a yearly reduction of 5.2 percentage points), and in the educational transfers sites, from 71 percent in 2000 to 30 percent in 2006/2007 (a yearly reduction of 6.83 percentage points). Movements of previously poor households across the poverty threshold have been substantial—across study sites, households that moved out of poverty consist of 44 percent of households in the microfinance sites, 54 percent of households in the agricultural technology sites, and 45 percent of households in the educational transfers sites. Despite the reduction in poverty,

[6] We thank Ambar Narayan and Nobuo Yoshida for making the poverty line estimates for the past years available.

26 percent of core households in the educational transfers sites, 16 percent of core households in the microfinance sites, and 16 percent of households in the agricultural technology sites are chronically poor, indicating that their conditions have not improved significantly over the long-term.

In what follows we will examine how baseline household characteristics and shocks experienced by households affect poverty transitions and per capita consumption. We conduct the analysis separately for each site, because the length of time between the baseline and the present survey is not the same across sites. We control for baseline household characteristics and unobserved community characteristics because current household characteristics could be affected by the same processes that brought about poverty transitions. Levels of current land and assets, for example, could reflect the same processes that are responsible for current consumption levels. Using past values of household characteristics would eliminate endogeneity bias. At present, we use thana-level dummies to control for unobserved community characteristics, but in future work we will use the community questionnaire to construct variables representing exogenous changes in institutions and market conditions in the community.

Household heads of the core households in our survey were around 43 years old during the baseline (Table 4). As of the baseline, most household heads had very little schooling—average schooling attainment is 2.77 years in the microfinance sites, 3.14 years in the agricultural technology sites, and 2.85 years in the educational transfers sites.[7] More than half of household heads have never attended school. Fifty-eight percent of household heads in the microfinance and educational transfers sites had never attended school, while 54 percent of heads in the agricultural technology sites had never attended school. Household sizes ranged from 5.27 persons in the microfinance sites to 5.67 persons in the agricultural technology sites. The area of land owned by households (including homesteads and cultivated land) ranged from 100.77 decimals in the educational transfers sites to 146.54 decimals in the agricultural technology sites (the latter is skewed by Mymensingh, which has relatively large landholding sizes)[8]. The agricultural technology households had higher nonland asset holdings valued at 15.94

[7] All household characteristics are evaluated as of the baseline, but monetary values are expressed in 2007 taka for comparability, since the baseline surveys for each study site took place in different years.
[8] 100 decimals = 1 acre

thousand taka (in 2007 prices), compared to 13.96 thousand taka and 12.16 thousand taka (both in 2007 prices) in the microfinance and educational transfers sites, which might be due to the selection of households that had enough assets (land and assets) to adopt the agricultural technologies. Households in the agricultural technology sites also had higher values of livestock (10.62 thousand taka) compared to those in the microfinance and educational transfers sites (7.56 thousand and 6.5 thousand, respectively).

Shocks are defined as adverse events that lead to a loss of household income, a reduction in consumption, a loss of productive assets, and/or serious concern/anxiety about household welfare. The data used in this section are based on a household-level "shocks" module similar to that developed in Hoddinott and Quisumbing (2003), but modified for the Bangladesh context. The module asks households to consider a list of adverse events and indicate whether the household was adversely affected by them. Shocks are divided into a number of broad categories: agroclimatic; economic; political/social/legal; crime; health; and life-cycle shocks. Agroclimatic shocks include flooding, but also erosion and pestilence affecting crops or livestock. Economic shocks include asset or property losses (not due to theft), but owing to river erosion, eviction, fires, or other reasons. Political/social/legal shocks in Bangladesh include extortion by *mastans* (organized crime syndicates), court cases and bribery, as well as long duration *hartals* (general strikes) and political unrest. Crime shocks include the theft and/or destruction of crops, livestock, housing, tools or household durables as well as crimes against persons. Health shocks include both death and illness. We distinguish between death of the primary income earner and death of other household members, and unlike shocks modules in other surveys, disaggregate the illness shock into the loss of income owing to illness or injury of a household member, and the medical expenses resulting from illness and injury. Life cycle shocks include dowry payments, wedding-related expenses, and property division (usually upon the death of the father in an intergenerationally extended household).[9] Finally, in addition to these questions about

[9] It can be argued that property division may not necessarily be a negative event for a household—if, for example, the household's land was managed by an elderly father, and the land was divided among two younger, able-bodied sons, it is possible that productivity could increase in the smaller parcels of land. While respondents listed property division as an adverse shock, they also listed receipt of inheritance (which typically accompanies property division) as a positive event. Whether or not property division results in positive or negative outcomes needs to be verified empirically.

specific shocks, households were also asked to enumerate the three most important adverse shocks that they had experienced since the last survey. These are summarized in Table 5.

More than half of all households in all three study sites report having been affected by shocks.[10] Although the prevalence of shocks varies slightly across sites, the most frequently reported shocks for all households are illness shocks (combining expenses related to illness and foregone income), dowry and wedding-related expenses, and floods. Combining both types of illness shocks, these account for 22 percent of most commonly reported shocks in the microfinance sites, 24 percent in the agricultural technology sites, and 22 percent in the educational transfers sites. Within the illness category, expenses related to illness are perceived as more detrimental to household welfare than income losses: 16 percent of reported shocks in the microfinance and educational transfers sites are from illness-related expenses alone. The corresponding figure for the agricultural technology sites is 19 percent. Dowry and wedding-related expenses account for 23 percent of reported shocks in the microfinance site, 16 percent in the agricultural technology site, and 18 percent in the educational transfers site. Finally, the next most frequently reported shock is flood-related: this is an aggregate of asset and crop losses due to floods, and accounts for 13 percent of reported shocks in all sites. The relative frequencies of shock reporting is consistent with the reporting of factors responsible for household decline or remaining in poverty obtained from the focus group discussions conducted in a subsample of these sites during Phase I of the current study (Davis 2007). Half (50%) of all focus groups listed dowry as responsible for household decline or remaining in poverty, followed closely by illness or injury (48%) and family size and dependency ratio (45%), the last of which cannot, strictly speaking, be considered as a "shock" or unexpected adverse event. Flooding accounted for only 25% of responses from the focus groups.

The same set of shocks—dowry and wedding expenses, illness-related expenses, and flood damage—continue to be reported as the first, second, or third most important

[10] Fifty-eight percent of households in microfinance sites, forty-nine percent of those in the agricultural technology sites, and fifty percent of those in the educational transfers sites reported having experienced a most important shock. Proportions do not change much for second most important and third most important shocks—percentages remain in the neighborhood of fifty percent across all sites.

shocks, although loss of income due to illness or injury, legal or political shocks, and crop losses emerge as important as well.

3. Determinants of poverty transitions and log consumption per capita, by poverty transition category

Tables 6, 7, and 8 present multinomial logit estimates of the probability of belonging to one of four poverty transition categories: (1) chronic poor; (2) falling into poverty; (3) moving out of poverty; and (4) never poor. These probabilities are a function of household characteristics in the baseline survey, unobserved community characteristics (proxied by thana dummies), and shocks experienced by the household between the baseline survey and 2006/2007. Because the timing of the baseline survey differs across sites, the recall period for shocks used in the poverty transition regressions differs across sites, and is defined as the interval between the baseline round and 2006/2007. Marginal effects are presented—that is, the impact of a one unit change in the independent variable on the probability of being in one of the four states. Although coefficient estimates were obtained for all four categories, the estimates for the "falling into poverty " category were unreliable because of the very few observations in that category, and are not reported.

In the microfinance sites (Table 6), the proportions of males and females 55 years and older were significant predictors of being chronically poor. The probability of being never poor increased with the educational attainment of the household head and household assets, but, as expected, decreased with the proportion of household members in the younger age groups. Surprisingly, having reported a shock connected to illness-related medical expenditures is positively associated with being never poor and negatively associated with being chronically poor. This suggests the presence of a systematic pattern in shocks reporting—it is quite possible that only better-off households are actually able to afford increased expenditures associated with illness.[11] Marginal effects on the probability of moving out of poverty are difficult to interpret: the signs of the significant variables are opposite in sign to the signs in the never poor regression. For example, an additional year of schooling appears to reduce the probability of moving up by 6.5%, while an additional year of schooling increases the probability of never being

[11] This reflects true respondent bias rather than upward biases in the consumption aggregate, since this version of the paper excludes health expenditures from the computation of the consumption aggregate.

poor by 6.9%. One interpretation is that the "moving up" probability is actually a conditional probability: it is the probability of being nonpoor now, conditional on being poor in the past. Thus, the marginal effects reflect a combination of the probability of being nonpoor now as well as of being poor in the past. Given this, however, the coefficients on the shocks variable in the "moving up" category are worth noting, because even if baseline characteristics may be associated with being never poor, shocks could prevent a household from moving out of poverty. Indeed, we find that illness-related expenses are negatively associated with households' moving out of poverty. Thana dummies are significant in this set of regressions, as well as for the other sites, indicating that unobserved locality effects are important in determining poverty transitions.

In the agricultural technology sites (Table 7), households with better-educated heads are less likely to be chronically poor, but larger households are significantly more likely to remain poor over the ten-year interval. The area of owned land, the value of nonland assets in 1996, and the value of livestock held in 1996 reduce the probability of being chronic poor. The results for the probability of being chronically poor are consistent with those for the probability of never being poor, which increases with years of schooling of the household head, and decreases with household size. The proportions of household members in various non-working age categories decrease the probability of being nonpoor in both periods, while higher values of livestock assets increase the probability of being nonpoor in both periods. While the coefficients in the "moving up" regression could partly reflect the probably of being "ever poor," illness-related expenses negatively reduce the probability of moving up. Indeed, illness-related income losses also reduce the probability of being never poor. Livestock deaths increase the probability of being chronically poor. The positive coefficient on property division in the "moving up" regression—but its negative impact on being never poor--deserves further scrutiny. This could indicate that, in some households, property division is not necessarily an adverse shock if it results in assets being controlled or owned by more productive household members. In others, however, it could result in losses of economies of scale or loss of access to public goods.

Finally, we turn to the results for the educational transfers sites (Table 8). Similar to the results for the previous sites, years of schooling of the household head is associated with increased probabilities of being never poor. Household size and the value of assets

exert opposite influences on the likelihood of being in poverty (never being poor) over the long term. In addition to household members less than 15 years of age, the number of females 55 years and older reduce the probability of being never poor.

Most of the coefficients on the shocks variables highlight the vulnerability of rural Bangladeshi households to unexpected events, although some of the results are inconsistent or could reflect selection bias. Death of an income earner increases the probability of being chronically poor, but legal shocks (typically court cases) and dowry-related expenses are negatively associated with being chronically poor—possibly a sign of respondent bias. Surprisingly, having experienced a flood reduces the probability of being chronically poor. Death of an income earner and death of another household member reduce the likelihood of being never poor, but floods and legal shocks increase the probability of moving up. Crop losses and asset losses decrease the probability of moving out of poverty.

What could be responsible for these inconsistent results? One possibility is that there is selection bias in shocks reporting. For example, it is possible that only better-off households will actually be able to pay for dowries and weddings, thus only wealthier households will report having these types of shocks. However, this explanation seems unlikely for a number of reasons. First, the Phase 1 FGD results showed that dowries and wedding costs were a major factor for moving into poverty for poor as well as wealthy women and men. Second, we have already purged the consumption aggregate of dowry and wedding costs.[12] A systematic analysis of the types of households that report certain types of shocks needs to be undertaken in future work. Miscounting of migrants as household members could also lead to an erroneous computation of per capita expenditures, although this is unlikely to be a cause for underestimating per capita expenditures, since an individual had to be counted as coresident for three out of six months to be considered a household member.

Poverty transition categories may also be defined in a very arbitrary fashion, and could be subject both to the definition of the poverty line as well as transitory shocks that could put an individual above or below the line at a given point in time. Some degree of

[12] Our recomputation of the consumption aggregate may have eliminated most of the misclassifications that resulted because of expenditures associated with illness, dowries, and legal expenses. Indeed, the ongoing life histories work suggests that much of the misclassification in the "moving up" and "falling down" categories—which were based on the old consumption aggregate--occurred because of wedding and dowry expenses, medical costs, and other similar lumpy expenditures (Baulch and Davis 2007).

arbitrariness is, unfortunately, a consequence of using a categorical dependent variable such as poverty transition categories, which are themselves defined with reference to a fixed poverty threshold.

3.2 Determinants of log per capita consumption: Quantile regression estimates

An alternative is to estimate quantile regressions (Koenker and Bassett 1978, 1982) on log per capita consumption, evaluated at quantiles corresponding to log per capita consumption of each transition category. Estimating quantile regressions makes sense if we suspect that error terms are not homoscedastic or if we suspect that the responsiveness of the dependent variable (per capita expenditure) to the regressors differs across the expenditure distribution (see Deaton 1997 for other reasons to estimate quantile regressions). For example, per capita expenditures may respond more strongly to years of schooling in the upper ranges of the per capita expenditure distribution than in the lower ranges. In this paper, we want to find out whether the impact of the regressors on log per capita expenditures differs for the chronic poor, the never poor, those who moved up, and those who moved down, but instead of dividing the sample by these admittedly endogenous categories and estimating regressions on a subset of the data, we utilize all the data for estimation and estimate quantile regressions with reference to quantiles of log per capita consumption of those categories.

Tables 9, 10, and 11 present simultaneous quantile regression estimates of log per capita expenditures in 2007, according to quantiles of poverty transition categories. The regressors are identical to those used in the multinomial logit regressors, except that for all subsequent regressions on per capita consumption, whether quantile regressions or OLS, the recall period for shocks is defined as the last 10 years (between 1997 and 2006/2007) in all study sites. The last column of each table presents the interquantile regression, whose coefficients test the difference between the "never poor" and "chronic poor" regressions. Recall that quantile regression estimates allow us to discern whether the responsiveness of log per capita consumption to various exogenous variables differs across the per capita expenditure distribution. However, there are very few cases in which responsiveness differs significantly across the per capita expenditure distribution. In the microfinance regression (Table 9), only three coefficients are statistically significantly different across the never poor and chronically poor categories: the coefficients on males 55 and older, livestock death, and asset losses. In the agricultural

technology regressions (Table 10), only the coefficients on the value of livestock, the impact of floods, and legal and political shocks are statistically different across quantiles, and in the educational transfers quantile regressions (Table 11), only the coefficient on legal and political shocks differs significantly between the highest and lowest categories. Nevertheless, although there are very few significant differences between the never poor and the chronic poor quantiles, a number of suggestive findings emerge in most of the quantile regressions: (1) education of the household head increases log per capita consumption; (2) the proportion of males 55 and older (and in some cases, females 55 and older) decreases log per capita consumption; (3) the value of assets increases consumption; (4) the impact of shocks is not predictable; and (5) unobserved community effects, as indicated by the thana dummies, are important.

Given that there does not seem to be much variation in the responsiveness of per capita consumption across the per capita expenditure distribution, in the next section we estimate OLS regressions, but examine whether the impact of shocks differs across household types.

4. Determinants of per capita consumption

In this section, we attempt to refine our estimates of the quantitative impact of shocks by examining whether their impact varies across household types. We could estimate differential impacts across household types either by stratifying the sample according to baseline household characteristics, or by interacting a dummy variable corresponding to the stratification criterion with all the regressors. To test whether coefficients are significantly different across household types, we do the latter and then test for the joint significance of the interaction terms. Tables 12, 13, and 14 present estimates of log per capita consumption, by site, first, with household characteristics as of the baseline round as regressors, and then, with household characteristics interacted with the stratifying dummy variable. These dummy variables are: (1) whether the area of the household's owned land is less than the median; (2) whether the household head has less than four years of schooling; and (3) whether the value of the household's nonland and nonlivestock assets are less than the median. Again, we use a ten-year recall period for shocks in all the study sites.

4.1 Baseline household characteristics

Estimates of the relationship between baseline household characteristics and per capita consumption are found in the "main effects" regression in all three sites (Tables 12, 13, and 14, first specification). Among households in the microfinance study sites (Table 12), education of the household head and the area of total land owned increase log per capita consumption. The proportion of children ages 0-4 and the proportion of males and females 55 years and older significantly decrease log per capita consumption. In the agricultural technology sites (Table 13), educational attainment of the household head also shows a clear positive impact on consumption—per capita consumption increases by 2.7% with each additional year of schooling. While, as expected, household size decreases log per capita consumption, the proportions in various age-sex categories are not significant for the sample as a whole (with the exception of males aged 5-14). Land owned and the value of nonland assets increase the value of log per capita consumption. Finally, among households included in the educational transfers studies (Table 14), household characteristics have similar effects: per capita consumption increases with educational attainment of the household head and the value of nonland assets, while higher proportions of males and females 55 years and older, and males aged 0-4, decrease per capita consumption.

4.2 Impact of shocks on per capita consumption

The focus group discussions analyzed in Davis (2007) highlight the role of shocks in causing people to fall into poverty or to remain chronically poor. This section attempts to arrive at quantitative estimates of the impact of shocks on per capita consumption. These results are only suggestive, because the econometric estimates show a mixed impact of shocks, possibly because of intervening factors (such as assistance programs) and respondent bias. For example, while death of a household member, illness-related income losses and dowry and wedding expenses negatively impact per capita consumption of microfinance site households, having experienced crop losses and illness-related expenses (Table 12) are associated with higher consumption expenditures, albeit weakly. Property division is also associated with higher consumption expenditures.

In the agricultural technology sites, death of the main income earner has a significant negative impact on consumption, decreasing per capita consumption by 6.0%, while death of another household member reduces per capita consumption by 12.1 percent (Table 13). However, a number of shocks have unexpected positive impacts on

consumption. Floods, asset or house losses, and dowry and wedding expenses all have significant positive impacts on per capita consumption as a whole. In the educational transfers sites, while illness related income losses reduce per capita expenditures by 12.9% in the "main effects" regression, illness-related expenses are associated with higher per capita expenditures (Table 14).

However, it is possible that shocks have differential impacts across different types of households. We therefore examine the interactions terms of the stratifying dummy variables with households characteristics. Among the microfinance households, the interaction terms are jointly significantly different from zero for those households with less than four years of schooling—indicating that household behavior and responses to shocks may be quite different across these two types of households. Indeed, livestock deaths and division of property have a significant negative impact on households whose heads have less than four years of schooling. However, there are also some surprising results: illness-related income losses and death of a household member both are associated with higher per capita consumption of households whose heads have less than four years of schooling, while dowry and wedding expenses, while having a negative impact on households as a whole, are associated with higher per capita consumption for households whose heads have less than four years of schooling.

While only the interaction terms with the dummy variable for less than four years of schooling were significant in the microfinance study sites, interactions with the dummy for less than median land are significant for the agricultural technology households. Dowry and wedding expenses have a greater negative impact on those with less than median landholding size. Surprisingly, interactions with the dummy for less than median landholding size are positive and significant for livestock deaths, property division, and death of a household member. While death of a household member may increase per capita consumption, this may be purely due to the definition of the dependent variable. It is, however, possible that property division may be a positive event for those with less than median landholdings as of the baseline, since they may now have received land from inheritance.

Interactions with the dummy variables for less than median landholdings, less than four years of schooling, and less than median asset value are all jointly significant for the educational transfers households. The death of a household member has a larger

negative impact on households with less than median landholdings, while property division has the opposite (positive) effect on those with less than median landholdings. Interestingly, asset losses have a stronger negative impact on those households whose heads have less than four years of schooling and households with less than median assets, but floods have a positive effect on both types of households. The positive impact of floods felt by households with less than four years of schooling and households with less than median assets is consistent with better targeting of emergency assistance towards the poor. This pattern is also consistent with findings of a study on the long-term impact of food assistance following the 1998 floods, which found that while the amounts distributed were limited, they had a larger positive impact on households in the bottom quintile of the asset distribution (Quisumbing 2005).

5. Concluding remarks and areas for further work

Although the results of this paper are preliminary and will need to be updated once we have access to the full range of data collected in the longitudinal survey (in particular the community survey and life history data), the results to date are suggestive. First, the results confirm the importance of schooling and assets as determinants of per capita consumption as well as being chronically poor or never poor. Second, the significance of two key demographic categories—children below age 15 and males and females above 55─point to the importance of life-cycle and demographic factors in creating and transmitting poverty.[13] Having older household members in particular makes the household vulnerable to a whole suite of related shocks such as illness, death, and property division. Third, our analysis highlights the importance of illness shocks—in particular, the income foregone when an income earner falls ill—as contributing to poverty. Fourth, while our results for dowries may still indicate respondent bias, their negative impact on consumption in general (among the microfinance households), and on the consumption of those with less than median assets (among the agricultural technology households) suggests that dowry expenses represent a substantial drain on household resources, consistent with the findings from the qualitative work. In a society where consumption levels are already low, dowries represent forced savings as households with

[13] Note that the Phase I focus group discussions also identified demographic and life-cycle factors as among the important drivers of poverty (Davis 2007).

daughters significantly reduce consumption to save up for dowries (Deolalikar and Rose 1998). Lastly, unobservable community effects are consistently significant, pointing to the important role of community-level variables in affecting movements out of poverty.

A clear next step for this analysis will be to incorporate more detailed information on geographic variables and changes in community-level variables into the analysis. The GPS coordinates that were collected as part of the Phase II quantitative survey might, for example, be used to estimate the distance from the household to key government services or markets. Unpacking the unobservable community effects in this way may yield potentially useful insights into what types of infrastructure investments would be conducive to movements out of poverty. Second, to lessen respondent bias in shocks reporting, community reports of aggregate shocks (such as floods) could be used instead of self-reports, even if it does not eliminate respondent bias in reporting other (idiosyncratic) shocks. Finally, the detailed life history interviews being collected in the ongoing Phase III of this study will be useful both for triangulating the poverty transitions observed in the household survey data and for understanding the drivers of consumption changes and movements into and out of poverty.

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Table 1. Sample sizes of treatment and control groups, by intervention

Intervention/Year	Treatment	No. of households	Control	No. of households
Microfinance (1994/95, 2006/7)	Participants in microfinance NGOs in all villages	114	Nonparticipants in microfinance NGOs in all villages (eligible but nonparticipants)	118
Agricultural technologies				
Improved vegetables (1996/7, 2000, and 2006/7)	NGO members in villages where improved technologies were disseminated	110	NGO members in villages where improved technologies had not yet been disseminated	110
Individual fishponds (1996/7 and 2006/7)	Individual pond owners in villages where improved technologies were disseminated	110	Individual pond owners in villages where improved technologies had not yet been disseminated	110
Group fishponds (1996/7 and 2006/7)	NGO members in villages where improved technologies were disseminated	110	NGO members in villages where improved technologies were disseminated	110
Educational transfers (2000, 2003, and 2006)	Households in FFE unions	320	Households in non-FFE unions	160

Note: The microfinance sites include 118 households who are not eligible to participate because they have more than one acre of land. The agricultural technology sites also include 110 other households who are randomly selected from non-NGO members in each site. The educational transfers sites started out with 400 treatment households and 200 control households in the 2000 round. In 2003, two thanas were dropped; the number of households reported in the table is the number of treatment and control households in the 2003 round.

Table 2. Distribution of surveyed households, "core" households, and splits, by study site, 2007

Study site	Number of households in 2007 survey round						
	Households lost due to migration, absence, death, or merging	New households due to household division		Number of original households tracked	Total number of households in 2007 round	Attrition	
		(Total)	(Interviewed)			(% attrited)	(% attrited per year)
Microfinance	21	75	54	350	404	5.7	0.4
Agricultural technology							
Improved vegetables	13	109	96	313	409	4.0	0.4
Individual fishponds	40	100	60	320	380	11.1	1.1
Group fish ponds	15	139	124	324	448	4.4	0.4
Educational transfers	31	62	31	480	511	6.1	2.0
Total	120	485	365	1,787	2,152	6.3	0.8

Table 3. Determinants of attrition between reference survey round and 2006/2007 round, by study site, probit regressions, marginal effects reported

	Microfinance site		Agricultural technology site		Educational transfers site	
Regressors as of baseline round	**dy/dx**	**z**	**dy/dx**	**z**	**dy/dx**	**z**
Age of household head	-0.001	-0.45	0.001	1.64	-0.001	**-1.92**
Education of head	0.003	**2.04**	0.000	0.06	0.000	0.79
Household size	-0.012	-1.40	-0.007	-1.28	-0.002	-1.05
Proportion of household in age-sex categories (age 20-34 excluded)						
Ages 0-4	0.001	0.89	0.001	1.39	0.000	-1.25
Ages 5-14	0.001	0.99	0.001	1.19	0.000	**-1.68**
Ages 15-19	0.000	0.29	0.000	0.26	0.000	-0.06
Ages 35-54	0.000	0.29	0.001	1.34	0.000	-1.08
Ages 55 and older	0.001	**1.99**	0.001	**2.37**	0.000	-0.51
Area of own land in decimals	0.000	0.15	0.000	-0.26	0.000	-0.99
Value of assets (in 1000 taka, 2007 prices)	0.000	**-1.91**	0.000	-1.32	0.000	**1.67**
Value of livestock (in 1000 taka, 2007 prices)	-0.001	-1.17	0.000	-0.54	0.000	-0.43
Village attrition rate in past survey rounds	-0.008	**-2.25**	-0.001	-0.35	0.001	**1.98**
Thana dummies for microfinance households (Ulipur excluded)						
Rajarhat, Kurigram	-0.005	-0.50				
Saturia, Manikganj	-0.026	**-2.95**				
Trishal, Mymensingh	0.006	0.60				
Bahubal, Habiganj	-0.012	-1.55				
Thana dummies for agricultural technology households (Manikganj excluded)						
Mymensingh			0.075	**6.21**		
Kishoreganj			0.087	**27.52**		
Jessore			0.027	**3.97**		
Thana dummies for educational transfers sites (Nilphamari excluded)						
Mohadepur, Naogaon					0.972	**7.27**
Sherpur Sadar, Sherpur					0.988	**7.14**
Madhupur, Tangail					0.984	**7.45**
Nayagati (Kalia), Narail					0.976	**6.72**
Agolijhara, Barisal					0.990	**6.94**
Hazigonj, Chandpur					0.994	**6.50**
Chakaria, Cox's Bazaar					0.995	**6.88**
Joint tests of parameters (Chi-square, p-value)						
All demographic categories=0	1.20	0.88	7.87	**0.05**	17.90	**0.00**
All thana effects=0	165.26	**0.00**	919.31	**0.00**	138.59	**0.00**
Observed probability	0.05		0.05		0.06	
Predicted probability	0.02		0.03		0.01	
Number of observations	347		957		475	
Pseudo R-squared	0.17		0.01		0.19	

Notes: z-values in bold are significant at 10% or better. The sample sizes for the regressions refer to the number of original households for whom we have complete data in the baseline round.

Table 4. Characteristics of core households in microfinance, agricultural technology and educational transfer sites

	Microfinance site		Agricultural technology site		Educational transfers site	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Number of core households	(325)		(908)		(449)	
Per capita expenditures and poverty incidence						
Per capita expenditure in baseline survey (in 2007 prices)	921.77	458.05	967.64	564.57	819.77	624.13
Per capita expenditures in 2006/2007	1381.73	832.31	1491.63	756.84	1249.61	707.05
Whether poor in baseline survey	0.60	0.49	0.70	0.46	0.71	0.46
Whether poor in 2007	0.21	0.41	0.18	0.38	0.30	0.46
Poverty transition category						
Chronic poor	0.16	0.36	0.16	0.36	0.26	0.44
Falling into poverty	0.05	0.22	0.02	0.15	0.03	0.18
Moving out of poverty	0.44	0.50	0.54	0.50	0.45	0.50
Nonpoor	0.35	0.48	0.28	0.45	0.26	0.44
Characteristics in baseline survey						
Age of household head	42.78	12.77	44.84	12.80	43.46	9.83
Education of household head (years of schooling)	2.77	3.96	3.14	4.00	2.84	3.79
Household size	5.27	2.39	5.67	2.65	5.60	2.00
Percent males 0-4 years	5.91	10.57	5.01	9.72	5.76	9.28
Percent females 0-4 years	5.86	10.09	4.61	9.27	5.57	9.50
Percent males 5-14 years	12.82	14.90	13.25	14.32	18.94	14.83
Percent females 5-14 years	13.66	15.18	11.10	13.60	20.01	15.67
Males 55 and older	4.78	9.95	4.69	8.88	3.01	6.98
Females 55 and older	3.98	11.36	4.36	9.26	2.43	7.04
Total land area (in decimals)	112.56	191.66	146.54	202.05	100.77	195.88
Value of nonlivestock assets (1,000 taka, 2007 prices)	13.96	36.45	15.94	33.99	12.16	28.98
Value of livestock (1,000 taka, 2007 prices)	7.56	10.11	10.62	10.48	6.50	10.12

Notes: Number of core households refers to the number of original respondents who were reinterviewed in 2006/2007. These statistics do not include household splits. All monetary values are in 2007 taka

Table 5. Household self-reports of the worst shocks experienced in the last 10 years (1997-2006/2007)

	Microfinance site	Agricultural technology site	Educational transfers site
Most commonly reported			
Dowry and wedding expenses	0.23	0.16	0.18
Expenses related to illness or injury of a family member	0.16	0.19	0.16
Loss of income due to illness or injury	0.06	0.05	0.06
Floods (damage, loss of crops, loss of assets)	0.13	0.13	0.13
Livestock deaths	0.09	0.10	0.08
Crop losses unrelated to floods	0.08	0.07	0.07
Legal and policy shocks (court cases)	0.07	0.09	0.09
Loss of assistance or transfer from family, NGO, or government	0.01	0.01	0.08
Asset losses	0.03	0.03	0.04
Theft and crime	0.02	0.04	0.03
House losses	0.01	0.00	0.01
Job losses	0.00	0.00	0.01
Death of main income earner	0.02	0.02	0.01
Death of other family member	0.03	0.01	0.02
Division of father's property	0.00	0.00	0.00
Most commonly reported, by degree of importance			
Worst shock			
Dowry and wedding expenses	0.24	0.15	0.16
Expenses related to illness or injury of a family member	0.22	0.23	0.21
Floods (damage, loss of crops, loss of assets)			0.13
Loss of income due to illness or injury	0.12		
Legal or political shock		0.11	
Second worst shock			
Dowry and wedding expenses	0.21	0.20	0.19
Expenses related to illness or injury of a family member	0.22	0.24	0.20
Floods (damage, loss of crops, loss of assets)	0.14	0.13	0.15
Third worst shock			
Dowry and wedding expenses	0.22	0.18	0.17
Expenses related to illness or injury of a family member		0.17	0.17
Floods (damage, loss of crops, loss of assets)	0.18	0.20	0.16
Crop losses	0.13		

Table 6. Determinants of poverty transitions, multinomial logit estimates, microfinance sites

	Prob (chronic poor)		Prob (never poor)		Prob (moving up)	
	dy/dx	**z**	**dy/dx**	**z**	**dy/dx**	**z**
Household characteristics in 1994						
Age of household head	0.000	0.04	-0.003	-0.08	0.002	0.08
Age of head squared	0.000	-0.29	0.000	-0.06	0.000	0.10
Education of head (years of schooling)	-0.004	-0.95	0.069	**3.50**	-0.065	**-2.80**
Household size	0.008	0.85	-0.033	-1.49	0.025	1.11
Percent of household members						
Males 0-4	0.001	**1.78**	-0.010	**-2.88**	0.009	**2.63**
Females 0-4	0.000	0.47	-0.011	**-2.62**	0.010	**2.73**
Males 5-14	0.000	0.19	-0.010	**-2.73**	0.009	**2.79**
Females 5-14	0.000	0.90	-0.008	**-2.79**	0.008	**2.78**
Males 55 and older	0.001	**2.06**	0.005	0.47	-0.006	-0.54
Females 55 and older	0.001	**3.36**	-0.016	**-3.54**	0.016	**3.29**
Total land owned	0.000	-0.72	0.000	0.12	0.000	0.25
Value of assets ('1000 taka, 2007 prices)	-0.004	**-7.14**	0.006	0.46	-0.002	-0.16
Value of livestock ('1000 taka, 2007 prices)	0.000	-0.03	0.011	**2.29**	-0.011	**-1.94**
Shocks experienced between 1994 and 2006						
Floods	-0.011	-0.38	0.218	1.30	-0.207	-1.47
Crop losses	-0.004	-0.23	-0.158	-1.57	0.162	**1.82**
Livestock death	-0.019	-1.23	-0.044	-0.50	0.062	0.83
Asset or house losses	-0.021	-0.78	0.091	0.68	-0.070	-0.52
Legal or political shocks	0.014	0.91	0.075	0.79	-0.088	-1.05
Death of income earner	-0.023	-0.87	0.163	0.90	-0.140	-0.81
Death of other household member	-0.017	-0.89	0.097	0.48	-0.080	-0.39
Illness-related income loss	0.022	1.02	-0.023	-0.29	0.000	0.00
Illness-related expenses	-0.018	**-2.04**	0.119	**4.75**	-0.102	**-3.28**
Dowry and wedding expenses	-0.001	-0.09	-0.131	**-7.21**	0.132	**5.10**
Property division	-0.046	-1.14	0.216	1.04	-0.169	-0.89
Thana dummies (Ulipur excluded)						
Rajarhat, Kurigram	0.007	0.39	-0.182	**-3.33**	0.175	**2.49**
Saturia, Manikganj	-0.015	-1.38	-0.212	**-2.16**	0.227	**2.51**
Trishal, Mymensingh	-0.003	-0.50	0.018	0.36	-0.015	-0.29
Bahubal, Habiganj	-0.011	-1.33	-0.012	-0.17	0.023	0.35
Actual probability	0.16		0.35		0.44	
Predicted probability	0.03		0.40		0.56	

Notes: Marginal effects reported. z-values in bold are significant at 10% or better
Although the category for falling into poverty was included in the estimation, marginal effects for this category were not computed since standard errors were unreliable owing to the very small number of households in this category.

Table 7. Determinants of poverty transitions, multinomial logit estimates, agricultural technology sites

	Prob (chronic poor)		Prob (never poor)		Prob (moving up)	
	dy/dx	**z**	**dy/dx**	**z**	**dy/dx**	**z**
Household characteristics in 1996						
Age of household head	0.003	**2.37**	0.001	0.08	-0.004	-0.32
Age of head squared	0.000	**-1.78**	0.000	-0.09	0.000	0.27
Education of head (years of schooling)	-0.008	**-14.62**	0.031	**4.83**	-0.023	**-3.43**
Household size	0.006	**2.20**	-0.055	**-14.03**	0.049	**7.82**
Percent of household members						
Males 0-4	0.001	0.72	-0.009	**-4.94**	0.008	**5.31**
Females 0-4	0.001	0.97	-0.006	**-2.00**	0.006	**1.68**
Males 5-14	-0.001	-1.14	-0.003	-1.37	0.004	**2.67**
Females 5-14	-0.001	-0.95	-0.005	**-8.33**	0.006	**7.47**
Males 55 and older	0.001	1.28	0.003	**2.18**	-0.004	**-2.31**
Females 55 and older	0.000	0.07	0.001	0.76	-0.001	-1.59
Total land owned	0.000	**-10.26**	0.000	1.45	0.000	-0.51
Value of assets ('1000 taka, 2007 prices)	-0.002	**-4.82**	0.003	**5.39**	-0.002	**-2.22**
Value of livestock ('1000 taka, 2007 prices)	-0.002	**-1.72**	0.008	**2.27**	-0.006	**-2.05**
Shocks experienced between 1997 and 2006						
Floods	-0.020	-1.36	0.023	0.43	0.000	0.00
Crop losses	-0.029	**-2.59**	-0.024	-0.45	0.054	0.88
Livestock death	0.029	**2.22**	-0.022	-0.88	-0.009	-0.29
Asset or house losses	-0.032	**-3.05**	-0.015	-0.97	0.046	**7.11**
Legal or political shocks	-0.011	-0.97	0.055	1.37	-0.046	-0.90
Death of income earner	0.002	0.06	0.036	0.32	-0.037	-0.32
Death of other household member	0.022	0.70	-0.024	-0.39	0.008	0.26
Illnes-related income loss	0.018	0.66	-0.055	**-5.26**	0.038	**2.06**
Illness-related expenses	-0.023	**-2.29**	0.111	**4.60**	-0.086	**-3.76**
Dowry and wedding expenses	0.026	1.11	0.015	0.18	-0.043	-0.45
Property division	-0.088	**-5.73**	-0.192	**-6.18**	0.283	**11.95**
Thana dummies (Saturia excluded)						
Mymensingh	0.002	0.27	-0.143	**-6.79**	0.142	**8.84**
Kishoreganj	0.040	**2.09**	-0.116	**-4.26**	0.079	**3.66**
Jessore	0.023	**2.44**	-0.157	**-7.63**	0.136	**6.83**
Actual probability	0.16		0.28		0.54	
Predicted probability	0.07		0.25		0.67	

Notes: Marginal effects reported. z-values in bold are significant at 5% or better
Although the category for falling into poverty was included in the estimation, marginal effects were not computed for this category because standard errors were unreliable, owing to the very small number of households in this category.

Table 8. Determinants of poverty transitions, multinomial logit estimates, educational transfers sites

	Prob (chronic poor)		Prob (never poor)		Prob (moving up)	
	dy/dx	**z**	**dy/dx**	**z**	**dy/dx**	**z**
Household characteristics in 2000						
Age of household head	-0.004	-0.22	0.039	1.43	-0.034	-0.79
Age of head squared	0.000	0.01	0.000	-1.63	0.000	1.05
Education of head (years of schooling)	-0.013	-1.06	0.036	**4.62**	-0.022	**-2.24**
Household size	0.040	**2.95**	-0.064	**-4.01**	0.023	1.41
Percent of household members						
Males 0-4	0.006	**2.15**	-0.009	**-2.97**	0.003	0.73
Females 0-4	0.009	**2.80**	-0.014	**-3.43**	0.005	1.41
Males 5-14	0.003	0.86	-0.010	**-4.63**	0.007	**2.19**
Females 5-14	0.005	**1.89**	-0.009	**-6.25**	0.004	1.60
Males 55 and older	0.007	**3.11**	0.006	1.19	-0.013	**-2.41**
Females 55 and older	0.009	**1.69**	-0.007	**-1.89**	-0.002	-0.45
Total land owned	0.000	-0.28	0.000	**2.90**	0.000	-1.43
Value of assets ('1000 taka, 2007 prices)	-0.005	**-1.72**	0.010	**2.74**	-0.005	-0.93
Value of livestock ('1000 taka, 2007 prices)	-0.005	-0.79	0.010	**3.72**	-0.004	-0.58
Shocks experienced between 2001 and 2006						
Floods	-0.135	**-4.60**	-0.035	-0.51	0.170	**3.19**
Crop losses	0.033	0.43	0.061	0.73	-0.094	**-1.77**
Livestock death	-0.003	-0.07	0.047	1.09	-0.044	-1.22
Asset or house losses	0.041	1.06	0.008	0.16	-0.049	**-2.01**
Legal or political shocks	-0.076	**-2.09**	-0.040	-0.77	0.116	**2.14**
Death of income earner	0.371	**2.20**	-0.186	**-4.07**	-0.185	-1.35
Death of other household member	0.063	0.55	-0.137	**-2.90**	0.074	0.77
Illness-related income loss	0.127	1.49	-0.075	-1.12	-0.053	-0.74
Illness-related expenses	-0.052	-1.10	-0.006	-0.12	0.057	1.14
Dowry and wedding expenses	-0.091	**-2.07**	0.053	1.05	0.038	0.54
Property division	0.022	0.05	0.173	0.59	-0.194	-1.39
Thana dummies (Nilphamari Sadar excluded)						
Mohadepur, Naogaon	-0.150	**-6.59**	-0.057	**-2.03**	0.207	**4.44**
Sherpur Sadar, Sherpur	0.068	**1.73**	0.069	**1.89**	-0.137	**-3.29**
Madhupur, Tangail	-0.177	**-5.32**	0.120	**4.47**	0.056	1.54
Nayagati (Kalia), Narail	-0.218	**-6.26**	0.263	**5.62**	-0.045	-0.69
Agolijhara, Barisal	0.081	1.46	-0.106	**-4.51**	0.025	0.49
Hazigonj, Chandpur	-0.037	-1.12	0.205	**7.05**	-0.168	**-3.09**
Chakaria, Cox's Bazaar	-0.102	**-3.01**	-0.028	-0.58	0.130	**1.89**
Actual probability	0.26		0.26		0.45	
Predicted probability	0.22		0.19		0.59	

Note: Marginal effects reported. z-values in bold are significant at 5% or better
Although the category for falling into poverty was included in the estimation, marginal effects were not computed for this category because standard errors were unreliable, owing to the very small number of households in this category.

Table 9. Simultaneous quantile regression estimates of log per capita expenditures in 2007, microfinance households

	Chronic poor		Falling down		Moving up		Never poor		Interquantile regression	
	Coeff	**t**	**Coeff**	**t**	**Coeff**	**t**	**Coeff**	**t**	**Coeff**	**t**
Household characteristics in 1994										
Age of household head	0.005	0.24	0.010	0.44	-0.022	-1.23	-0.010	-0.55	-0.016	-0.58
Age of head squared	0.000	-0.16	0.000	-0.31	0.000	1.57	0.000	0.93	0.000	0.78
Education of head (years of schooling)	0.022	1.42	0.026	**1.77**	0.021	**2.32**	0.021	**1.91**	-0.001	-0.04
Household size	0.001	0.03	-0.012	-0.47	-0.026	-1.29	-0.013	-0.51	-0.014	-0.42
Percent of household members										
Males 0-4	-0.004	-0.83	-0.002	-0.43	-0.007	**-2.26**	-0.008	**-2.07**	-0.004	-0.72
Females 0-4	-0.001	-0.28	-0.001	-0.34	-0.003	-0.77	-0.002	-0.36	0.000	-0.05
Males 5-14	0.002	0.61	0.003	0.93	0.001	0.28	0.000	-0.14	-0.002	-0.59
Females 5-14	-0.002	-0.55	0.000	-0.06	0.001	0.28	-0.002	-0.52	0.000	0.02
Males 55 and older	0.000	0.06	0.000	0.05	-0.012	**-2.50**	-0.014	**-2.63**	-0.014	**-2.02**
Females 55 and older	-0.003	-0.58	-0.002	-0.56	-0.005	-1.19	-0.004	-0.96	-0.001	-0.20
Total land owned	0.001	**1.76**	0.001	**1.85**	0.000	1.45	0.000	1.13	0.000	-0.53
Value of assets ('1000 taka, 2007 prices)	0.000	-0.21	0.000	-0.18	0.001	0.48	0.002	0.78	0.003	0.93
Value of livestock ('1000 taka, 2007 prices)	0.000	-0.06	-0.001	-0.14	0.003	0.70	0.003	0.52	0.003	0.44
Shocks experienced between 1997 and 2006										
Floods	0.075	0.70	0.050	0.47	0.027	0.24	-0.040	-0.31	-0.115	-0.78
Crop losses	0.033	0.25	0.018	0.14	0.169	**2.20**	0.103	1.10	0.071	0.48
Livestock death	0.155	1.41	0.161	1.52	-0.095	-1.36	-0.055	-0.70	-0.210	**-1.69**
Asset or house losses	0.218	**1.94**	0.190	**1.74**	-0.088	-1.19	-0.077	-0.89	-0.295	**-2.24**
Legal or political shocks	0.072	0.69	0.103	1.08	0.075	0.89	0.108	1.24	0.035	0.29
Death of income earner	0.070	0.36	0.117	0.61	0.182	1.31	0.097	0.62	0.028	0.13
Death of other household member	-0.057	-0.41	-0.049	-0.36	-0.077	-0.72	-0.141	-1.20	-0.084	-0.51
Illness-related income loss	-0.023	-0.19	-0.035	-0.31	-0.061	-0.65	-0.067	-0.64	-0.044	-0.31
Illness-related expenses	0.088	1.01	0.086	1.05	0.043	0.54	0.042	0.47	-0.045	-0.40
Dowry and wedding expenses	-0.053	-0.47	-0.068	-0.62	-0.103	-1.45	-0.060	-0.71	-0.007	-0.05
Property division	0.249	0.71	0.252	0.72	0.255	0.84	0.164	0.56	-0.084	-0.21

(continued)

Table 9. Continued

	Chronic poor		Falling down		Moving up		Never poor		Interquantile regression	
	Coeff	**t**	**Coeff**	**t**	**Coeff**	**t**	**Coeff**	**t**	**Coeff**	**t**
Thana dummies (Ulipur excluded)										
Rajarhat, Kurigram	-0.061	-0.34	-0.075	-0.44	-0.043	-0.41	0.003	0.02	0.064	0.31
Saturia, Manikganj	0.162	0.86	0.249	1.39	0.269	**1.80**	0.382	**2.17**	0.220	0.93
Trishal, Mymensingh	0.218	1.35	0.200	1.32	0.098	0.82	0.123	0.85	-0.095	-0.48
Bahubal, Habiganj	0.163	0.94	0.138	0.83	0.245	**2.04**	0.347	**2.39**	0.184	0.87
Constant	6.158	**11.82**	6.101	12.19	7.419	**18.23**	7.194	**17.17**	1.036	**1.69**
Quantile	0.11		0.13		0.56		0.67		0.67-0.11	
Pseudo-R2	0.22		0.21		0.21		0.22			

Note: Bootstrapped standard errors, 1000 replications.
t-values in bold indicate significance at 10% or better. Standard errors are robust to clustering within thanas

Table 10. Simultaneous quantile regression estimates of log per capita expenditures in 2007, agricultural technology households

	Chronic poor Falling down (a)		Moving up		Never poor		Interquantile regression	
	Coeff	**t**	**Coeff**	**t**	**Coeff**	**t**	**Coeff**	**t**
Household characteristics in 1996								
Age of household head	-0.010	-0.80	0.008	0.86	0.009	0.78	0.019	1.21
Age of head squared	0.000	0.64	0.000	-0.87	0.000	-0.83	0.000	-1.10
Education of head (years of schooling)	0.025	**4.31**	0.029	**5.19**	0.028	**4.79**	0.002	0.31
Household size	-0.027	**-1.97**	-0.007	-0.76	-0.015	-1.48	0.013	0.81
Percent of household members								
Males 0-4	-0.002	-0.94	-0.001	-0.54	0.000	-0.07	0.002	0.75
Females 0-4	-0.001	-0.40	-0.001	-0.48	0.001	0.47	0.002	0.68
Males 5-14	0.002	1.22	0.002	1.30	0.001	0.94	-0.001	-0.37
Females 5-14	0.001	0.45	0.002	1.26	0.001	0.51	0.000	0.01
Males 55 and older	-0.006	**-1.85**	-0.001	-0.31	0.000	-0.06	0.006	1.39
Females 55 and older	0.002	0.56	0.000	-0.07	-0.001	-0.59	-0.003	-0.88
Total land owned	0.000	**1.99**	0.000	**2.25**	0.000	**2.33**	0.000	0.39
Value of assets ('1000 taka, 2007 prices)	0.001	0.98	0.001	0.84	0.001	1.10	0.000	0.07
Value of livestock ('1000 taka, 2007 prices)	0.008	**3.17**	0.001	0.70	0.001	0.37	-0.007	**-2.23**
Shocks experienced between 1997 and 2006								
Floods	0.157	**2.54**	0.069	1.51	0.034	0.61	-0.123	**-1.74**
Crop losses	0.004	0.07	0.087	**1.94**	0.027	0.56	0.023	0.31
Livestock death	0.035	0.69	-0.014	-0.39	-0.039	-0.93	-0.075	-1.22
Asset or house losses	0.073	1.06	0.057	1.14	0.095	1.59	0.023	0.27
Legal or political shocks	-0.010	-0.17	0.038	0.71	0.119	**2.13**	0.129	**1.79**
Death of income earner	-0.148	-1.50	-0.097	-1.26	-0.077	-0.94	0.071	0.64
Death of other household member	0.029	0.29	-0.088	-1.06	-0.171	**-1.77**	-0.200	-1.60
Illness-related income loss	-0.082	-1.00	-0.049	-1.08	-0.066	-1.30	0.016	0.18
Illness-related expenses	0.006	0.14	0.014	0.40	0.014	0.33	0.008	0.14
Dowry and wedding expenses	0.022	0.41	-0.010	-0.23	0.060	1.20	0.038	0.61
Property division	0.231	**1.72**	0.075	0.41	0.169	0.85	-0.062	-0.29
Thana dummies (Saturia excluded)								
Mymensingh	-0.077	-0.82	0.072	1.00	0.069	0.90	0.146	1.36
Kishoreganj	0.099	1.34	-0.048	-0.82	-0.082	-1.17	-0.181	**-1.93**
Jessore	0.155	**2.34**	0.014	0.27	-0.024	-0.42	-0.179	**-2.24**
Constant	6.818	**24.91**	6.855	**32.99**	7.021	**28.10**	0.202	0.59
Quantile	0.10		0.55		0.68		0.68-0.10	
Pseudo-R2	0.12		0.12		0.12			

Notes: Bootstrapped standard errors, 1000 replications
t-values in bold indicate significance at 10% or better. Standard errors are robust to clustering within thanas
a. Chronic poor and falling down categories were merged because their quantile on the per capita expenditure distribution were very similar

Table 11. Simultaneous quantile regression estimates of log per capita expenditures in 2007, educational transfers households

	Chronic poor Falling down (a)		Moving up		Never poor		Interquantile regression	
	Coeff	**t**	**Coeff**	**t**	**Coeff**	**t**	**Coeff**	**t**
Household characteristics in 2000								
Age of household head	0.013	0.54	-0.025	-1.00	-0.009	-0.34	-0.022	-0.69
Age of head squared	0.000	-0.35	0.000	1.08	0.000	0.35	0.000	0.56
Education of head (years of schooling)	0.012	1.20	0.025	**2.80**	0.020	**2.14**	0.008	0.72
Household size	0.005	0.25	-0.016	-1.09	-0.019	-1.20	-0.024	-1.05
Percent of household members								
Males 0-4	-0.007	**-2.02**	-0.009	**-2.51**	-0.009	**-2.55**	-0.002	-0.50
Females 0-4	-0.001	-0.30	-0.007	**-2.55**	-0.004	-1.32	-0.003	-0.71
Males 5-14	0.004	1.27	-0.002	-0.69	-0.003	-0.95	-0.006	-1.62
Females 5-14	0.000	-0.06	0.000	0.01	-0.001	-0.29	-0.001	-0.18
Males 55 and older	-0.006	-0.84	-0.010	**-1.83**	-0.004	-0.58	0.002	0.22
Females 55 and older	-0.007	-1.41	-0.008	**-2.34**	-0.009	**-2.35**	-0.002	-0.38
Total land owned	0.000	-0.43	0.000	1.13	0.000	0.83	0.000	1.15
Value of assets ('1000 taka, 2007 prices)	0.003	1.17	0.005	**2.05**	0.006	**2.20**	0.002	0.91
Value of livestock ('1000 taka, 2007 prices)	0.002	0.54	0.002	0.49	0.003	0.63	0.001	0.19
Shocks experienced between 1997 and 2006								
Floods	0.145	**2.44**	0.048	0.92	0.067	1.14	-0.078	-1.06
Crop losses	0.017	0.27	-0.012	-0.20	-0.006	-0.09	-0.023	-0.27
Livestock death	-0.038	-0.59	-0.018	-0.35	0.032	0.56	0.070	0.92
Asset or house losses	-0.056	-0.70	0.040	0.73	0.034	0.53	0.089	1.00
Legal or political shocks	0.073	0.97	-0.039	-0.79	-0.072	-1.22	-0.145	**-1.69**
Death of income earner	-0.196	-1.09	0.015	0.12	0.030	0.23	0.225	1.20
Death of other household member	0.076	0.67	0.051	0.39	0.057	0.54	-0.019	-0.13
Illness-related income loss	-0.046	-0.70	-0.119	**-2.20**	-0.146	**-2.21**	-0.100	-1.19
Illness-related expenses	0.022	0.29	0.071	1.36	0.100	**1.69**	0.078	0.92
Dowry and wedding expenses	0.035	0.53	0.016	0.31	0.029	0.46	-0.006	-0.07
Property division	-0.209	-0.78	-0.202	-0.62	-0.099	-0.31	0.110	0.30
Thana dummies (Nilphamari Sadar excluded)								
Mohadepur, Naogaon	0.257	**1.94**	0.226	**2.41**	0.221	**1.95**	-0.036	-0.24
Sherpur Sadar, Sherpur	-0.068	-0.59	0.095	1.16	0.010	0.10	0.079	0.56
Madhupur, Tangail	0.169	1.09	0.338	**3.72**	0.314	**2.83**	0.144	0.87
Nayagati (Kalia), Narail	0.020	0.15	0.283	**2.59**	0.240	**1.87**	0.219	1.35
Agolijhara, Barisal	-0.073	-0.61	0.107	0.88	0.200	1.44	0.274	**1.72**
Hazigonj, Chandpur	0.031	0.22	0.247	**2.04**	0.347	**2.76**	0.316	**1.86**
Chakaria, Cox's Bazaar	0.154	1.04	0.331	**3.29**	0.269	**2.37**	0.115	0.71
Constant	6.068	**10.95**	7.458	**12.77**	7.260	**12.03**	1.192	1.59
Quantile	0.16		0.59		0.75		0.75-0.16	
Pseudo-R2	0.18		0.20		0.24			

Notes: Bootstrapped standard errors, 1000 replications

t-values in bold indicate significance at 10% or better. Standard errors are robust to clustering within thanas

a. Chronic poor and falling down categories were merged because their quantiles on the per capita expenditure distribution were very similar

Table 12. Determinants of log per capita expenditures, microfinance households: Testing influences of household characteristics in 1994

	Specification (1)		Specification (2)				Specification (3)				Specification(4)			
	Main effects only		Main effects		Interactions with less than median landholdings		Main effects		Interactions with less than 4 years of schooling		Main effects		Interactions with less than median assets	
	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t
Household characteristics in 1994														
Dummy variable being interacted					-0.295	-0.78			0.463	0.97			0.232	0.31
Other household characteristics														
Age of household head	-0.001	-0.26	-0.008	-1.48	-0.001	-0.05	0.030	**2.75**	-0.046	**-3.15**	-0.005	-0.25	-0.011	-0.31
Age of head squared	0.000	0.81	0.000	1.43	0.000	0.39	0.000	**-3.68**	0.001	**4.14**	0.000	0.28	0.000	0.32
Education of head (years of schooling)	0.028	**4.77**	0.024	**2.58**	0.008	0.31	0.021	**1.69**	0.045	1.06	0.029	**2.22**	0.021	-1.37
Household size	-0.012	-0.99	-0.008	-0.66	-0.007	-0.74	0.026	**3.42**	-0.046	**-5.57**	-0.013	-1.04	0.006	0.17
Percent of household members														
Males 0-4	-0.005	**-1.73**	-0.004	-1.16	-0.002	-0.45	-0.006	-1.01	0.000	-0.03	-0.003	-0.67	0.006	-1.42
Females 0-4	-0.003	**-1.75**	0.000	-0.04	-0.006	-0.73	-0.003	-0.59	-0.001	-0.26	-0.001	-0.39	0.006	-1.1
Males 5-14	-0.001	-0.29	0.003	1.11	-0.006	-1.44	-0.003	-0.82	0.002	0.36	0.001	0.27	0.003	-0.42
Females 5-14	0.000	-0.10	0.001	0.26	-0.003	-0.72	0.000	-0.14	-0.002	-0.54	0.002	0.78	0.005	-1.10
Males 55 and older	-0.008	-1.46	-0.005	-1.36	-0.003	-0.41	0.000	0.10	-0.012	**-2.12**	-0.006	-1.40	0.002	-0.42
Females 55 and older	-0.004	**-2.03**	-0.008	**-3.63**	0.005	1.24	-0.012	**-2.41**	0.009	1.15	-0.010	**-6.81**	0.008	**2.68**
Total land owned	0.000	**3.80**	0.001	**4.15**	0.000	-0.08	0.001	**2.97**	0.001	**1.69**	0.001	**7.50**	0.001	**-2.20**
Value of assets ('1000 taka, 2007 prices)	0.000	0.32	0.000	0.26	0.009	1.58	0.001	0.67	0.000	0.06	0.000	-0.19	0.028	1.43
Value of livestock ('1000 taka, 2007 prices)	0.002	0.59	0.003	0.65	-0.011	-0.82	0.005	1.40	-0.009	**-3.55**	0.004	1.08	0.008	-1.38
Shocks experienced between 1997 and 2006														
Floods	0.040	0.76	-0.056	-0.30	0.096	0.41	-0.121	-1.16	0.145	0.84	0.130	0.94	0.199	-1.03
Crop losses	0.113	**1.86**	0.180	**4.27**	-0.223	-1.33	0.070	0.78	0.101	1.27	0.060	0.49	0.044	0.20
Livestock death	-0.026	-0.37	0.015	0.22	-0.081	-1.25	0.032	0.36	-0.110	**-2.18**	-0.030	-0.38	-0.017	-0.24
Asset or house losses	0.012	0.17	-0.029	-0.26	0.052	0.50	0.027	0.13	-0.043	-0.21	0.034	0.40	0.036	-0.31
Legal or political shocks	-0.010	-0.15	-0.030	-0.35	0.046	0.98	-0.097	-0.86	0.108	0.82	-0.065	-0.75	0.060	0.79
Death of income earner	0.091	0.62	0.045	0.37	0.143	0.74	-0.051	-0.31	0.165	1.41	0.050	0.30	0.105	0.66
Death of other household member	-0.075	**-1.70**	-0.070	-1.11	-0.007	-0.07	-0.360	**-3.17**	0.378	**2.61**	-0.239	**-2.09**	0.394	**2.76**

(continued)

Table 12. Continued

	Specification (1)		Specification (2)				Specification (3)				Specification (4)			
	Main effects only		Main effects		Interactions with less than median landholdings		Main effects		Interactions with less than 4 years of schooling		Main effects		Interactions with less than median assets	
	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t
Illness-related income loss	-0.116	**-2.04**	-0.196	**-1.66**	0.203	0.95	-0.180	**-1.77**	0.136	**2.29**	-0.083	-0.95	0.045	-0.48
Illness-related expenses	0.060	**1.99**	0.071	1.11	0.004	0.03	0.105	1.25	-0.041	-0.43	0.065	1.26	0.053	1.03
Dowry and wedding expenses	-0.129	**-2.97**	-0.180	**-2.55**	0.113	0.77	-0.295	**-5.38**	0.291	**2.45**	-0.153	**-2.09**	0.126	1.16
Property division	0.249	**8.45**	0.338	**3.64**	(dropped)		0.737	**4.74**	-0.512	**-3.31**	0.290	**2.87**	0.295	1.51
Thana dummies (Ulipur excluded)														
Rajarhat, Kurigram	-0.064	**-2.12**	-0.239	**-2.77**	0.294	**2.98**	-0.233	**-2.13**	0.194	1.59	-0.039	-0.47	0.010	-0.10
Saturia, Manikganj	0.293	**3.76**	0.208	1.11	0.313	1.17	0.358	**2.66**	-0.015	-0.09	0.341	**2.10**	0.061	0.28
Trishal, Mymensingh	0.081	**2.09**	-0.135	**-2.61**	0.484	**3.99**	-0.370	**-12.32**	0.621	**9.24**	0.141	**2.06**	0.090	-0.88
Bahubal, Habiganj	0.229	**5.13**	0.087	0.71	0.285	1.40	0.027	0.44	0.296	**3.65**	0.330	**3.33**	0.082	-0.59
Constant	6.963	**51.65**	7.247	**21.20**			6.702	**15.21**			7.018	**18.68**		
Test for significance of interaction terms (F statistic, p-value)														
Interaction terms jointly equal to zero			1.17	0.44			12.91	**0.01**			0.78	0.60		
R-squared	0.37		0.43				0.45				0.43			
Sample size	314		314				314				314			

Notes: t-values in bold indicate significance at 10% or better. Standard errors are robust to clustering within thanas

Table 13. Determinants of log per capita expenditures, agricultural technology households: Testing influences of household characteristics in 1996

	Specification (1)		Specification (2)				Specification (3)				Specification (4)			
	Main effects only		Main effects		Interactions with less than median landholdings		Main effects		Interactions with less than 4 years of schooling		Main effects		Interactions with less than median assets	
	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t
Household characteristics in 1996														
Dummy variable being interacted					-0.200	-0.53			-0.027	-0.13			-0.037	-0.05
Other household characteristics														
Age of household head	0.004	0.53	0.004	0.33	-0.004	-0.22	0.008	0.40	-0.006	-0.38	0.005	0.23	0.001	0.04
Age of head squared	0.000	-0.62	0.000	-0.44	0.000	0.06	0.000	-0.50	0.000	0.49	0.000	-0.24	0.000	-0.16
Education of head (years of schooling)	0.027	**7.28**	0.025	**6.12**	0.003	0.34	0.028	**3.56**	0.024	1.39	0.020	**4.95**	0.008	0.70
Household size	-0.018	**-4.47**	-0.033	**-2.67**	0.045	**1.77**	-0.014	**-2.61**	-0.006	-0.52	-0.024	**-4.14**	0.017	0.64
Percent of household members														
Males 0-4	0.000	-0.07	0.001	0.12	-0.002	-0.35	-0.002	-0.49	0.003	0.64	-0.002	-0.48	0.002	**1.67**
Females 0-4	0.000	0.01	0.000	-0.12	-0.001	-0.14	-0.003	-1.14	0.004	1.27	0.002	0.45	-0.005	-0.69
Males 5-14	0.002	**1.97**	0.002	**2.76**	-0.001	-0.25	0.001	0.32	0.003	0.77	0.003	**8.64**	-0.002	**-3.08**
Females 5-14	0.001	0.68	0.000	-0.04	0.002	0.59	-0.002	-1.20	0.005	**2.08**	0.001	**2.75**	-0.001	-0.23
Males 55 and older	-0.001	-0.32	-0.001	-0.31	0.001	0.18	0.000	0.07	-0.002	-0.40	-0.001	-0.30	0.001	0.32
Females 55 and older	0.001	0.23	0.001	0.30	-0.005	-1.46	-0.001	-0.43	0.003	**1.69**	0.003	0.86	-0.006	**-1.87**
Total land owned	0.000	**11.32**	0.000	**6.37**	0.001	**1.67**	0.000	**3.20**	0.000	**2.86**	0.000	**10.46**	0.000	1.12
Value of assets ('1000 taka, 2007 prices)	0.001	**3.41**	0.001	**4.31**	0.001	0.89	0.001	**1.71**	0.000	0.27	0.001	**2.00**	0.040	**1.67**
Value of livestock ('1000 taka, 2007 prices)	0.002	1.32	0.004	1.21	-0.003	-0.44	0.002	0.65	0.001	1.56	0.000	0.21	0.003	**14.24**
Shocks experienced between 1997 and 2006														
Floods	0.081	**8.96**	0.100	**3.38**	-0.066	-1.42	0.099	1.50	-0.035	-0.46	0.082	**2.65**	-0.046	-0.80
Crop losses	0.040	1.09	0.007	0.18	0.079	1.08	0.014	0.50	0.050	0.94	0.078	**2.06**	-0.107	-1.56
Livestock death	-0.028	-1.05	-0.121	**-3.62**	0.186	**7.42**	-0.018	-0.27	-0.021	-0.30	-0.017	-0.65	-0.033	-0.51
Asset or house losses	0.098	**4.61**	0.050	1.29	0.093	1.55	-0.008	-0.08	0.181	1.09	0.087	1.44	-0.024	-0.22
Legal or political shocks	0.055	1.08	0.066	**1.91**	-0.005	-0.07	0.125	**1.90**	-0.141	**-1.89**	0.033	0.81	0.003	0.03
Death of income earner	-0.060	**-1.94**	-0.041	-0.55	-0.042	-0.31	-0.151	-1.45	0.152	1.36	-0.023	-0.73	-0.074	-0.72
Death of other household member	-0.121	**-6.00**	-0.138	**-11.26**	0.141	**5.92**	-0.093	-1.54	-0.068	-1.06	-0.093	**-4.08**	-0.115	-0.91
Illness-related income loss	-0.090	-1.64	-0.011	-0.16	-0.089	-1.25	-0.195	**-3.55**	0.172	**2.37**	-0.084	-0.95	-0.013	-0.13
Illness-related expenses	0.041	0.87	0.046	0.69	-0.007	-0.16	0.054	0.64	-0.022	-0.31	0.076	1.28	-0.081	-1.45
Dowry and wedding expenses	0.066	**2.08**	0.105	**4.42**	-0.112	**-7.05**	0.078	1.43	-0.033	-0.70	0.117	**3.15**	-0.137	**-5.37**
Property division	0.169	**1.67**	0.022	0.29	0.874	**4.24**	0.218	0.76	-0.101	-0.44	0.127	1.51	0.444	**11.69**

(continued)

Table 13. Continued

	Specification (1)		Specification (2)				Specification (3)				Specification (4)			
	Main effects only		Main effects		Interactions with less than median landholdings		Main effects		Interactions with less than 4 years of schooling		Main effects		Interactions with less than median assets	
	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t
Thana dummies (Saturia excluded)														
Mymensingh	0.015	**2.15**	-0.051	**-3.94**	0.124	**2.95**	0.032	1.41	-0.023	-0.91	0.038	**4.19**	-0.065	**-1.89**
Kishoreganj	-0.053	**-3.31**	-0.062	**-6.43**	-0.031	-0.73	0.008	0.17	-0.144	**-3.32**	0.016	0.86	-0.175	**-6.82**
Jessore	-0.017	-1.38	-0.089	**-7.12**	0.115	**4.99**	-0.004	-0.08	-0.025	-0.51	-0.007	-0.25	-0.024	-0.47
Constant	6.962	**46.57**	7.104	**26.33**			6.968	22.33			6.957	13.23		
Test for significance of interaction terms (F statistic, p-value)														
Interaction terms jointly equal to zero			7.97	0.06			1.08	0.48			1.50	0.37		
R-squared	0.19		0.23				0.22				0.24			
Sample size	804		804				804				804			

Notes: t-values in bold indicate significance at 10% or better. Standard errors are robust to clustering within thanas

Table 14. Determinants of log per capita expenditures, educational transfers households: Testing influences of household characteristics in 2000

	Specification (1)		Specification (2)				Specification (3)				Specification (4)			
	Main effects only		Main effects		Interactions with less than median landholdings		Main effects		Interactions with less than 4 years of schooling		Main effects		Interactions with less than median assets	
	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t
Household characteristics in 2000														
Dummy variable being interacted					0.590	0.66			-0.380	-0.33			-0.782	-0.61
Other household characteristics														
Age of household head	-0.008	-0.44	0.007	0.31	-0.040	-1.12	-0.016	-0.42	0.001	0.03	-0.014	-0.43	0.008	0.13
Age of head squared	0.000	0.64	0.000	-0.12	0.000	1.13	0.000	0.47	0.000	-0.01	0.000	0.42	0.000	-0.01
Education of head (years of schooling)	0.021	**8.22**	0.021	**2.88**	-0.010	-0.99	0.034	**2.40**	-0.029	-0.76	0.020	**4.95**	-0.021	**-2.83**
Household size	-0.022	-1.60	-0.028	-1.53	-0.016	-0.59	-0.020	-1.48	-0.012	-0.44	-0.020	-0.89	-0.007	-0.21
Percent of household members														
Males 0-4	-0.007	**-2.86**	-0.012	**-3.90**	0.008	1.22	-0.008	**-1.79**	0.002	0.26	-0.012	**-2.78**	0.012	**2.23**
Females 0-4	-0.005	-1.42	-0.005	-1.52	0.001	0.13	-0.007	-1.12	0.003	0.43	-0.004	-1.07	0.001	0.26
Males 5-14	-0.001	-0.40	-0.004	**-2.85**	0.006	**1.65**	-0.005	-1.04	0.007	1.21	-0.003	-1.09	0.009	**2.57**
Females 5-14	-0.001	-0.60	-0.002	-1.01	0.003	0.87	-0.004	-0.99	0.006	1.36	-0.003	-1.10	0.006	**1.90**
Males 55 and older	-0.009	**-2.89**	-0.011	**-2.03**	0.005	0.92	-0.012	**-1.79**	0.003	0.34	-0.007	-1.59	-0.003	-0.49
Females 55 and older	-0.008	**-3.18**	-0.014	**-2.30**	0.008	1.28	-0.014	**-3.01**	0.005	1.28	-0.010	**-1.75**	0.004	0.55
Total land owned	0.000	0.88	0.000	0.69	0.002	0.71	0.000	1.21	0.000	-0.57	0.000	0.85	0.000	-0.34
Value of assets ('1000 taka, 2007 prices)	0.004	**3.47**	0.003	**4.74**	0.012	1.43	0.004	**4.99**	0.004	**2.12**	0.003	**4.34**	0.028	1.29
Value of livestock ('1000 taka, 2007 prices)	0.003	1.01	0.003	0.81	-0.001	-0.21	0.003	0.78	-0.002	-0.37	0.004	1.13	-0.007	-1.59
Shocks experienced between 1997 and 2006														
Floods	0.061	1.24	0.041	0.99	0.060	0.72	-0.133	-1.60	0.298	**3.91**	0.006	0.09	0.165	**2.58**
Crop losses	0.015	0.31	0.050	0.71	-0.064	-0.65	-0.072	-0.88	0.123	0.93	-0.002	-0.03	0.021	0.39
Livestock death	0.011	0.20	-0.082	-1.43	0.172	1.60	-0.046	-0.77	0.062	0.54	-0.025	-0.39	0.078	0.93
Asset or house losses	0.029	0.96	0.045	0.79	-0.026	-0.34	0.143	**2.38**	-0.163	**-1.79**	0.097	1.59	-0.130	**-1.88**
Legal or political shocks	-0.016	-0.52	-0.048	-1.40	0.086	0.67	-0.079	**-1.66**	0.085	0.87	-0.070	-1.39	0.169	1.31
Death of income earner	-0.077	-1.11	-0.088	-1.36	0.034	0.18	0.043	0.24	-0.139	-0.57	-0.070	-1.18	0.084	0.51
Death of other household member	-0.008	-0.09	0.139	1.46	-0.239	**-2.16**	-0.058	-0.45	0.126	1.19	0.010	0.07	-0.056	-0.38
Illness-related income loss	-0.129	**-2.42**	-0.090	**-1.78**	0.008	0.11	-0.190	**-2.13**	0.093	1.07	-0.080	-1.18	-0.089	-1.03
Illness-related expenses	0.082	**3.15**	0.076	**1.85**	0.044	0.46	0.032	0.39	0.086	0.69	0.045	0.91	0.098	0.93
Dowry and wedding expenses	0.034	1.14	-0.012	-0.34	0.100	1.30	0.042	0.63	-0.014	-0.14	0.061	1.05	-0.047	-0.55
Property division	-0.076	-0.49	-0.199	**-2.91**	0.893	**8.40**	-0.235	**-1.99**	0.317	1.24	-0.169	-1.39	0.346	1.32

(continued)

Table 14. Continued

	Specification (1)		Specification (2)				Specification (3)				Specification (4)			
	Main effects only		Main effects		Interactions with less than median landholdings		Main effects		Interactions with less than 4 years of schooling		Main effects		Interactions with less than median assets	
	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t	Coeff	t
Thana dummies (Nilphamari Sadar excluded)														
Mohadepur, Naogaon	0.224	**8.27**	0.186	**6.81**	0.043	0.73	0.237	**6.94**	0.016	0.27	0.237	**5.16**	-0.007	-0.18
Sherpur Sadar, Sherpur	0.037	1.37	0.166	**3.97**	-0.217	**-4.32**	0.071	1.45	-0.021	-1.04	0.079	**1.76**	-0.051	-1.00
Madhupur, Tangail	0.278	**13.89**	0.255	**5.77**	0.098	**2.17**	0.117	**2.31**	0.231	**4.75**	0.211	**4.52**	0.156	**2.60**
Nayagati (Kalia), Narail	0.203	**7.84**	0.330	**5.36**	-0.230	**-4.18**	0.230	**5.19**	0.029	0.32	0.280	**5.28**	-0.141	**-2.29**
Agolijhara, Barisal	0.101	**2.99**	0.081	1.15	0.132	**1.77**	0.276	**5.29**	-0.253	**-2.72**	0.151	**2.05**	-0.096	-1.22
Hazigonj, Chandpur	0.261	**6.07**	0.377	**5.45**	-0.224	**-3.27**	0.419	**7.22**	-0.225	**-2.37**	0.371	**4.36**	-0.387	**-3.35**
Chakaria, Cox's Bazaar	0.240	**4.16**	0.467	**4.89**	-0.234	**-2.50**	0.272	**4.38**	-0.039	-0.34	0.350	**4.13**	-0.218	**-2.57**
Constant	7.032	**16.40**	6.849	**10.74**			7.382	**10.28**			7.364	**9.98**		
Test for significance of interaction terms (F statistic, p-value)														
Interaction terms jointly equal to zero			6.02	0.02			8.48	0.01			4.07	0.04		
R-squared	0.32		0.38				0.38				0.38			
Sample size	445		445				445				445			

Notes: t-values in bold indicate significance at 10% or better. Standard errors are robust to clustering within thanas