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Social Protection and Sustainable Poverty Reduction

Experimental Evidence from Bangladesh

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Abstract

Social protection programs are primarily focused on influencing household behavior in the short term, increasing consumption to reduce poverty and food insecurity, and promoting investments in human capital. A large body of evidence across numerous settings shows that cash and food transfer programs are highly effective in doing so. However, there is growing interest in understanding the extent to which such programs can help households stay out of poverty in the longer term, specifically after transfers end. We bring new evidence to this question, re-interviewing Bangladeshi households that participated in a well-implemented randomized social protection intervention four years after it ended. We find that combining transfers, either cash or food, with behavior change communication activities sustainably reduced poverty. Cash transfers alone had sustainable effects, but these were context-specific. The beneficial impacts of food transfers did not persist four years after the intervention finished.

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1. Introduction

Social protection has at least three broad objectives: protective, preventative, and promotional. Based on conceptualizations adapted from Devereux and Sabates-Wheeler (2004) and Guhan (1994), “protective” can be seen as measures without which, in the short term, households *will* be poor and food insecure; “preventative” as measures without which, in the short term, households will be at *risk* of poverty and food insecurity; and “promotional” as measures which, over the medium and longer term, can serve as a springboard to new economic opportunities for current and future generations. For social safety nets – a subset of social protection that includes direct cash and in-kind transfers – evidence has focused largely on the success of programming in meeting the first objective of protection. A large body of evidence across numerous settings shows that cash and food transfer programs are highly effective in increasing average household consumption (Ravallion, 2016), particularly of food (Hidrobo et al., 2018), and providing a minimum level of consumption in the short term. For Bangladesh, the focus of our work, studies showing impacts on consumption and poverty include Ferré and Sharif (2014), Pradham and Sulaiman (2014), Sharif and Ruthbah (2017), and Cho and Ruthbah (2018). There is some evidence on social protection’s ability to play a preventative role; see for example Knippenberg and Hoddinott (2017). However, there is limited work assessing its promotional role. Some evidence exists on social safety nets leading to investments in children’s human capital such as health, nutrition, and education (de Walque et al., 2020; Garcia and Saavedra, 2017), which may serve to provide longer term benefits as these children grow into adulthood, although evidence is mixed (see for example Molina et al., 2019; Baird et al., 2019; Duflo et al., 2015; Baez et al., 2011; Behrman et al., 2011; Barham, et al., 2019). But very little work looks at the years immediately following the end of transfers to assess whether households are able to maintain consumption and stay out of poverty during this period; one related study finds few sustained effects (Blattman et al., 2020). Further, there is limited evidence on whether the form or transfer modality (for example, cash or in-kind transfers) affects the sustainability of impacts.

Nonetheless, there is continued and growing interest in understanding the extent to which social safety net programs can help households stay out of poverty beyond the end of transfers. The central question is, when transfers of direct income to households cease, will these households’ poverty status revert to what it would have been had they never received the transfers? Or will their trajectory be influenced by previous receipt of transfers, such that they are less likely to be poor even after transfers cease? This issue is important from a policy perspective in several dimensions. First, setting budgets for public resources requires prioritizing across interventions. It is important to understand if programs that are protective and preventative must be traded off against alternative programs that are promotional (e.g., infrastructure projects like road-building, which might contribute to increased economic growth), or if instead, programming like social safety nets can serve all three objectives if well-designed. Second, design considerations and cost-effectiveness calculations for programs should account for both the programs’ immediate and longer-term impacts; yet we have little evidence on outcomes over the longer term for social safety nets. Finally, concerns are perennial regarding households developing long-term dependency on social safety net programs. Many fear that once households participate in such a program, it becomes very difficult to move them out without their falling back into poverty; thus, there is growing interest in how to design programs that help poor households “graduate” out of poverty. Evidence on longer-term impacts of social safety nets is thus important but rare, with even less known about what design features might facilitate longer-term

promotional objectives. In particular, scarce evidence exists on the extent to which program modality might matter, the extent to which complementary programming is necessary, and the extent to which the importance of these factors is context-specific.

In this paper, we aim to contribute to addressing several of these knowledge gaps. We focus on a sample of households that participated in a two-year social safety net pilot program called the Transfer Modality Research Initiative (TMRI). In TMRI, mothers of young children in poor rural households in two regions of Bangladesh received food or cash transfers, with or without a complementary nutrition behavior change communication (BCC) component, following a randomized control trial design. Prior evidence from TMRI shows that the program was well-implemented (Ahmed et al., 2019a) and effective in improving average consumption during its implementation (Ahmed et al., 2019b). We re-interview households from the control group and a subset of the treatment groups four years after the intervention ended. Linking data on this sample across baseline (before the intervention started), endline (just before the intervention ended), and 4-year post-program, we assess (i) program impacts on poverty headcount, depth, and severity in each round, (ii) differences by program receipt in household-level transitions across being poor or non-poor over the three rounds, (iii) program impacts on an aggregated measure of poverty over the time period from baseline to 4 years post-program. Our analyses focus on looking at the roles of design features and context: comparing cash vs. food; with vs. without complementary programming; and in the northern region vs. the southern region.

We find that combining transfers, either cash or food, with BCC sustainably reduced poverty across both contexts. Cash transfers alone had sustainable effects, but these were context-specific. The beneficial impacts of food transfers did not persist four years after the intervention ended in either context. Our suggestive evidence indicates that results differing by modality, presence of complementary programming, and context may be driven by the extent to which program benefits promoted investment. Cash transfers may better facilitate investment than food; the presence of complementary programming may increase empowerment or psychological well-being in ways that promote investment; and context may shape what kind of investment opportunities are available to the poor.

The paper proceeds as follows. We begin by describing our study design and the context within which it was implemented. We next describe our data, our poverty measures, and our empirical specifications. Results are presented, then discussion and concluding remarks follow.

2. Study design and context

Our study was situated in two areas of Bangladesh, Rangpur division (province) in the northwest (hereafter “North”) and Barisal and Khulna divisions in the south (hereafter “South”). Recent poverty and food insecurity rates were, on average, higher in Rangpur than anywhere else in Bangladesh with 31.3 percent of the population living in extreme poverty; comparable figures were 14.9 percent in Barisal and 13.1 percent in Khulna, the (by region) third and fifth highest prevalences in Bangladesh (BBS, 2019). As measured by the Food Consumption Score (FCS), 36 percent of households were food insecure in Rangpur as are 29 percent in Barisal and 24 percent in Khulna (HKI/JPGSPH, 2016). Other measures reinforce the idea that these are poor localities. Our baseline data (see below for more details) showed that education attainments are low with household heads averaging 1.4 and 2.0 years of

schooling in the North and South, respectively. About 93 percent of households in the North and about 87 percent of households in the South were functionally landless at baseline.¹ The most frequently reported occupations were farmer (33.4 and 21.3 percent in the North and South) and agricultural day laborer (18.0 and 37 percent in the North and South). This reflects, in part, agro-ecological differences in the two areas. In the North, land is available to rent in, and food and labor markets function well because they are physically accessible by reasonably good roads and are well-connected to each other. However, the topography of the south—flat, with multiple rivers and tributaries—leads to frequent flooding. With a coastline on the Bay of Bengal, the region is also prone to cyclones and saline water surges, with soil salinity making it more difficult in some places to grow crops or raise livestock. Relative to the northwest, the physical infrastructure is poorer, and markets—while widespread—function less well.

Between May 2012 and April 2014, the World Food Programme implemented a pilot safety net program, TMRI, in these two areas. Using a cluster randomized design, in the North, study villages were randomly assigned to a control group or to one of four treatment arms in which beneficiaries received cash transfers (“Cash”), food rations (“Food”), half cash transfers and half food rations (“Cash+Food”), or cash transfers along with nutrition behavior change communication activities (“Cash+BCC”). In the South, study villages were also randomly assigned to a control group or to one of four treatment arms; the first three treatment groups were the same as in the North. In the fourth treatment group in the South, instead of cash transfers along with nutrition BCC, beneficiaries received food rations along with nutrition BCC (“Food+BCC”). All beneficiaries were poor households with a child aged 0-24 months in March 2012. The mother of the child aged 0-24 months was the designated beneficiary – both the cardholder for receiving transfers and the target participant in BCC activities (see Ahmed et al. (2016) for more detail).

Beneficiaries in the “Cash” arms received a monthly payment of 1,500 Taka (approximately 19 USD) per household. Payments were delivered using a mobile phone cash transfer system, in which women collected cash from designated distribution sites using mobile verification of identity.² Beneficiaries in the “Food” arms received a monthly food ration of 30 kilograms (kg) of rice, 2 kg of *mosoor* pulse (a lentil), and 2 liters of micronutrient-fortified cooking oil. Rations were handed to beneficiaries at designated food distribution points. The initial value of the food rations was equal to the value of the cash transfers. Beneficiaries in the “Cash+Food” treatment arms received half of each of the two types of transfers: 750 Taka, 15 kg of rice, 1 kg of *mosoor* pulse, and 1 liter of micronutrient-fortified cooking oil. Further details are in Roy et al. (2019a).

The beneficiaries of the “Cash+BCC” arm in the North and the “Food+BCC” arm in the South received the same transfers as in the “Cash” only and “Food” only treatment groups, respectively, as well as a suite of intensive nutrition BCC interventions focused on education and behavior change at the

¹ In Bangladesh, a household with less than half an acre of cultivable land is defined as “functionally landless”.

² Since this method used a mobile phone handset and SIM card, to preserve the design of the experiment, these were provided to all women in the study (in all treatment and control arms).

household and community level (Ahmed et al., 2016). The BCC intervention involved three complementary activities: (1) weekly group BCC trainings – some with beneficiaries only and some that invited other family members as well, (2) twice-a-month visits to the beneficiaries' homes, and (3) monthly group meetings between program staff and influential community leaders.

About 9-15 beneficiaries were part of each group. The group trainings took place within 2 km of beneficiaries' homes and lasted approximately one hour, on average. Beneficiaries assigned to a BCC intervention attended on average 48 (in the North) to 49 (in the South) of the scheduled 52 sessions per year. Trainings covered basic nutrition, control and prevention of micronutrient deficiencies, infant and young child feeding, health care, maternal nutrition, and hygiene. The training was led by female Community Nutrition Workers (CNWs) engaged by a local NGO specifically for TMRI. CNWs also conducted the twice-per-month home visits to observe household-level practice and encourage the adoption of positive behaviors, as well as followed up with additional home visits as needed for individual counseling to beneficiaries. Although attendance at the group BCC sessions was a "soft" condition of receipt of the transfers, no beneficiaries were dropped from the study for failing to attend sessions; when a mother missed a session, a CNW would follow up with a home visit to uncover why she missed the session and to convey the missed information. The monthly group meetings with influential community members (such as village heads, religious leaders, school teachers, community elected persons, and local health and family planning staff) were conducted by CNWs and staff from the local NGO, without the beneficiaries present, to explain the purpose and importance of the BCC and to provide them with the information being conveyed to study participants.

3. Data

3.1 Sample and attrition

In each region, 250 villages were selected for inclusion in the study and were randomly assigned to one of the four treatment groups described above or the control group for its region. From each village, 10 households were selected for inclusion in TMRI, with all households interviewed at baseline. Thus, TMRI included a total of 5,000 targeted households across the North and South – 4,000 treatment households and 1,000 control households. For the initial impact evaluation, three surveys were conducted: a baseline survey in March-April 2012 prior to the start of the intervention in May 2012, a midline survey in June 2013, and an endline survey in April 2014 just before the end of intervention. Then, to assess short-term sustainability of selected impacts, a post-program survey was conducted from October 2014 to February 2015, 6 to 10 months after the intervention ended. Finally, to assess longer-term sustainability of a range of impacts on households, women, and children, another post-program survey was conducted from April-May 2018, 4 years after the intervention ended (denoted "4yPP" for "4 years post-program").

The baseline, midline, and endline surveys attempted to interview all 5,000 households that were included in TMRI treatment or control groups. Due to budget constraints, the 4yPP survey excluded the Cash+Food arms in both regions. Thus, the starting point for our sample selection is the 4,000 households in the Cash, Food, Cash+BCC, Food+BCC, and Control groups at baseline. Of those baseline households 3,683 (92.1%) were successfully re-interviewed four years after the program. Figure 1 shows the sample flow diagram. After dropping 24 households who split from existing ones after the

baseline and dropping another 20 who had been mistakenly interviewed at baseline, 3,639 households remain in the sample. We also drop 56 households with incomplete consumption expenditure data. The remaining 3,583 households constitute our final estimation sample, all of whom have consumption expenditure data across the three survey rounds (baseline, endline, 4yPP). Of those, 1,820 (50.8%) households are located in the North and 1,763 (49.3%) in the South.

Attrition from the 4,000 households in the relevant baseline sample to the 3,583 households in our 4yPP estimation sample is about 10% (or just under 2% per year). To assess whether attrition is correlated with treatment assignment, we regress the attrition indicator, which equals one if the household attrited from baseline to 4yPP, on the treatment arms using a simple ordinary least squares (OLS) model. We do this separately for the North and the South (Table 1). There is no indication that attrition over time is correlated with treatment assignment; the magnitude of attrition rates is low, and none of the point estimates is statistically different from zero.

3.2 Poverty measures

We use the international poverty line of USD\$1.90 per person per day, converted into the local currency equivalent (LCE) at 2011 purchasing power parity (PPP) exchange rates. The poverty line is adjusted for cumulative inflation, from 2011 to the month and year the survey data were collected, using a consumer price index. The 2011 PPP exchange rate for Bangladesh is \$1 = 24.8492³. For the price index, we used the rural general consumer price index (RGCPi) estimated by the Bangladesh Bureau of Statistics (BBS). The data for the RGCPi available from the BBS has a base year in 2005/06. Since the 2011 PPP exchange rate was used for the analysis, the base year of the RGCPi was converted from 2005/06 to 2011 for our calculations. Average RGCPi was calculated for the survey months of the study in case where data collection were over multiple months. As noted above, the baseline survey was carried out in March-April 2012, the endline survey was conducted in April 2014, and the 4yPP survey was carried out in April 2018. Accordingly, the RGCPi used in our poverty analysis was 104.71 for the 2012 baseline, 120.67 for the endline, and 148.94 for the 4yPP survey. Using this information, the LCE is calculated as:

$$LCE = \left[\frac{1.90 \times PPP_{2011}}{100} \right] \times RGCPi_{2011}$$

Based on this, the USD\$1.90 per person per day LCE poverty lines were 49.44 taka for the 2012 baseline, 56.97 taka for the endline, and 70.32 taka for the 4yPP survey.

We use consumption expenditure as a proxy for income to calculate the poverty indicators used in this paper. Our measure of consumption expenditure is quite extensive and draws upon responses to several sections of the household survey. In brief, consumption is measured as the sum of total food consumption and total nonfood (nondurable and durable) expenses. Expenditures on individual consumption items were aggregated to construct total expenditures. This was first done at the household level. These household aggregates were subsequently divided by the number of household members to obtain consumption expenditure per person per day. Quantities of goods produced by the

³ Retrieved from <http://databank.worldbank.org/data/home.aspx>

household for home consumption were valued at the average unit market prices of commodities. Lumpy and infrequent expenditures such as dowry, wedding costs, pilgrimage, etc. were excluded from the calculations.

We calculate three measures of poverty from the Foster-Greer-Thorbecke (FGT) class of poverty measures (Foster et al., 1984) – the headcount, depth, and severity of poverty. Let $x = (x_1, x_2, \dots, x_n)$ be the income distribution among N individuals, where $x_i \geq 0$ is the income of the individual i . The poverty line is denoted by z . For any income distribution, x , individual i is said to be poor if $x_i < z$. The normalized deprivation, $\left(\frac{z-x_i}{z}\right)$, of individual i , who is poor, with respect to z is given by his or her relative shortfall from the poverty line. The FGT class of poverty measures are, thus, defined as:

$$P_\alpha = \frac{1}{N} \sum_{i=1}^N 1(x_i < z) \left(\frac{z-x_i}{z}\right)^\alpha$$

where $\alpha \geq 0$ is a parameter that defines the poverty measure. When $\alpha = 0$, we get the incidence or headcount measure (P_0) of poverty since the normalized deprivation is equal to 1 for all of the poor. Thus, the headcount measure estimates the proportion of individuals who are below the poverty line. We use the headcount measure in our analyses to examine if the TMRI interventions have successfully reduced the proportion of households below the poverty line.

A well-known criticism of the headcount measure is that it is not sensitive to changes in the distribution of income below the poverty line. Thus, we calculate the intensity or depth of poverty (P_1) also referred to as the poverty gap index. When $\alpha = 1$, normalized deprivation reflects the intensity or depth of poverty, with a higher value of deprivation being assigned to poorer individuals, i.e. those who are further away from the poverty line. The normalized deprivation score for households whose income weakly exceeds z , is always set equal to 0. The depth of poverty thus measures the mean proportionate poverty gap in the population (where the non-poor have zero poverty gap), i.e. it adds up the extent to which individuals on average fall below the poverty line, as a ratio of the poverty line. For instance, a value of 0.6 means that the average shortfall in income of people living below the poverty line is 60 percent of the poverty line. We also calculate the squared gap or severity of poverty (P_2) measure by setting $\alpha = 2$. This measure squares the normalized deprivation of the poor and thereby takes into account the inequality among the poor by setting more weight to deprivations that are further away from the poverty line.

The state of being poor or non-poor can change in subsequent time periods with households falling into or escaping poverty. To examine whether the TMRI transfers have sustainably helped beneficiary households to escape poverty, we construct poverty dynamics, or transition matrices. We have eight states of transitions that a household can belong to across the three rounds of survey; we denote these with the household's poverty status in each round (P if poor or N if non-poor). The eight categories are: (1) chronic poor (PPP), (2) moved out after project (PPN), (3) transient poor (PNP), (4) moved out during project and stayed out (PNN), (5) fell into during and stayed poor (NPP), (6) transient

poor (NPN), (7) fell into after project ended (NNP), and (8) never poor (NNN). Here, for example, chronic poor households are those households that have been identified as poor (P) in the baseline, endline, and 4 year post-program surveys and are labelled as PPP for three consecutive periods of poverty, while households that are poor (P) in the baseline, poor (P) in the endline, but non-poor (N) at 4yPP – i.e. moved out after the project ended – are labelled PPN. The PNN category identifies households that are poor at baseline, but move to being non-poor at endline, and stay non-poor at 4yPP; for our analysis, we interpret this category as suggesting sustained poverty reduction for an initially poor household (see Figure 2).

A challenge with these transition matrices is that it is not straightforward how to “rank” the different transition categories, as they do not provide a single aggregate measure of poverty over the entire time period. Although we could count the number of rounds in which a household is poor, for example, a PNN household and an NPN household would be equivalent by this metric, whereas we may view these very differently in terms of program impact. Extending from the FGT class of poverty measures, Calvo and Dercon (2007) propose a multi-period counting approach to redress this issue, where period-by-period poverty spells are combined using a weighted sum into one aggregate measure of poverty over a period of time. This measure consists of T spells according to the equation below:

$$CD = \sum_{t=1}^T P_t \beta^{T-t}$$

where $P_t = 1$ if the household is poor at time period t , β captures the weight assigned to poverty status in any given period and $\beta > 0$. We use the above measure to estimate a Calvo-Dercon (CD) poverty score for each household in our sample. For our case, $T = 3$ since we have three rounds of survey information or possible poverty spells. Since we are interested to examine if the TMRI interventions had sustainable impact on poverty, we consider $\beta = 0.85$ which implicitly puts more weight on poverty spells in the latter rounds. Thus, if a household was poor in the baseline, it is assigned a value of 0.7225; if poor in endline, it is assigned a value of 0.85; and finally if it is poor in the 4 year post-program survey, it is assigned a value of 1. Summation over the three rounds gives us a CD poverty score for each household ranging from a value of 0 if never poor to 2.5725 if poor in all three rounds.

4. Empirical specification

Our empirical analysis draws on the randomized control trial design of TMRI. All estimation is conducted separately by region, and all estimates adjust standard errors for clustering at the village level, which was the level of randomization.

To present trends on poverty headcount, we estimate the proportion of poor households in each intervention arm and round by region. To estimate treatment impacts on the poverty headcount, depth, and severity measures at endline and 4yPP, we conduct intent-to-treat analysis in each round using analysis of covariance (ANCOVA), controlling for the baseline value of the outcome. We use equation (1) for the North and equation (2) for the South:

$$(1) \quad Y_{int} = \beta_{0N} + \beta_{FN} * Food_{iN} + \beta_{CN} * Cash_{iN} + \beta_{BN} * Cash_BCC_{iN} + \delta_N * Y_{iN1} + \varepsilon_{int}$$

$$(2) \quad Y_{ist} = \beta_{0S} + \beta_{FS} * Food_{iS} + \beta_{CS} * Cash_{iS} + \beta_{BS} * Food_BCC_{iS} + \delta_S * Y_{iS1} + \varepsilon_{ist}$$

where Y_{iNt} and Y_{iSt} denote the outcome for household i , in region N or S (North or South), at time t (endline or 4yPP). Y_{iN1} and Y_{iS1} denote baseline outcomes, θ_{0N} and θ_{0S} are constant terms for each region, and ε_{iN1} and ε_{iS1} are terms for unobservables, which we assume to be normally distributed. $Food_{iNt}$, $Cash_{iNt}$, and $Cash_BCC_{iNt}$ are dummy variables for a household in the North being assigned to Food, Cash, or Cash+BCC respectively, and $Food_{iSt}$, $Cash_{iSt}$, and $Food_BCC_{iSt}$ are dummy variables for a household in the South being assigned to Food, Cash, or Food+BCC respectively; corresponding coefficients reflect treatment impacts of these arms relative to the region's control group. For poverty headcount, we estimate regressions using OLS; for poverty depth and severity, we estimate censored regressions based on tobit models. In our analysis, we interpret sustainability of impacts as coefficients for treatment impact relative to the control at 4yPP being significantly different from zero (reflecting that outcomes in the treatment group have not fully converged to the control group).

For poverty transitions, we estimate the proportion of households in each transition category, by intervention arm and region. For each transition category, we then conduct Wald tests to assess whether the share of households in that category differs between the treatment arms and the control.

For the Calvo-Dercon poverty score, denoted CD , we estimate intent-to-treat impacts using censored regressions, and conduct Wald tests to test significance of differences in impact across arms, based on equations (3) and (4):

$$(3) \quad CD_{iN} = \beta_{0N} + \beta_{FN} * Food_{iN} + \beta_{CN} * Cash_{iN} + \beta_{BN} * Cash_BCC_{iN} + \varepsilon_{iN}$$

$$(4) \quad CD_{iS} = \beta_{0S} + \beta_{FS} * Food_{iS} + \beta_{CS} * Cash_{iS} + \beta_{BS} * Food_BCC_{iS} + \varepsilon_{iS}$$

5. Results

5.1 Average impacts on poverty

5.1.1 Poverty headcount

We begin by looking at descriptive trends over time in the poverty headcount, comparing the control arm to the treatment arms in each region (Figure 3). At baseline, as expected due to the randomization of treatment arms, the control and treatment arms exhibit similar rates of poverty. Baseline poverty headcount is higher in the North than South – at around 76 percent in the North, compared to around 60 percent in the South – consistent with the national data described in Section 2. Between baseline and endline for the control arm, poverty headcount remains largely unchanged in the North, while it decreases in the South by around 10 percentage points. Between baseline and endline for the treatment arms, in both the North and South, there are large reductions in poverty, and these reductions are larger than for the control arms. This is not surprising; the endline survey took place just before the last transfers were made, thus we would expect that the transfers increased consumption (Ahmed et al., 2019b) and potentially reduced poverty in the treatment arms relative to the control. Comparing trends across treatment modalities from baseline to endline, in both the North and South, poverty is reduced by similar magnitudes in the Cash and Food arms. Notably, the arms that combine BCC with a transfer (cash in the North, food in the South) show larger decreases in poverty between baseline and endline than the other treatment arms. This pattern is also consistent with endline findings by Ahmed et al. (2019b), which shows greater increases in consumption from arms with BCC and

suggests the group-based format contributed to increases in women’s empowerment (Roy et al., 2019a) and changes in household investments and livelihoods.

Between endline and 4yPP, poverty headcount continues to decrease in the control arms in both regions. However, trends between endline and 4yPP differ among the treatment modalities. In the North, the prevalence of poverty in the Food arm remains largely unchanged, converging toward the control arm at 4yPP; poverty in the Cash arm continues to decrease; and poverty in the Cash+BCC arm slightly increases but remains below the other arms. In the South, the prevalence of poverty in the Food and Cash arms stays the same or slightly decreases, converging toward the control group; poverty slightly increases in the Food+BCC arm although it remains below the other arms.

Table 2 presents impact estimates for each treatment arm, by region, at endline and 4yPP corresponding to these trends. At endline, all treatment arms in both regions lead to large significant reductions in poverty. Within each region, cash and food transfers cause similar reductions in poverty: 14 and 12 percentage points respectively in the North, and 9 and 11 percentage points respectively in the South. The differences in the Food and Cash impacts at endline are not statistically significant. This is consistent with the value of transfers being equal across modalities; it aligns with the prior evidence from TMRI that endline impacts on consumption were similar across food and cash arms (Ahmed et al, 2019b) as well as evidence from other contexts showing comparable short-term impacts from equal-value food and cash transfers (Hidrobo et al., 2014). The treatment arms with BCC have much larger impacts on poverty, reducing the headcount index by 34 percentage points in the North and 23 percentage points in the South. Differences between BCC and non-BCC treatments in both the North and South are statistically significant. At 4yPP, in the North, there are no longer significant impacts on poverty in the Food arm; however, impacts on poverty in the Cash and Cash+BCC arm remain statistically significant, albeit smaller than at endline (for Cash, nine percentage points at 4yPP compared to 14 percentage points at endline; for Cash+BCC, 12 percentage points at 4yPP compared to 34 percentage points at endline). In the South, by 4yPP there are no longer meaningful impacts on poverty from any arm; point estimates for the Food and Cash arms are near zero, and the point estimate for Food+BCC is about 6 percentage points reduction but is not statistically significant.

Overall, trends and impact estimates show that poverty headcount decreases more among all treatment arms than the control group while transfers are provided; however, patterns differ after transfers stop. As described above, we do not interpret sustainability of impact as treatment arms maintaining the same gap with the control group post-program as during the program; we interpret sustainability as treatment arms maintaining *some* significant gap with the control group at 4yPP, thus not having reverted or converged to the control group’s outcome fully. With this interpretation, our results suggest that sustainability of impact on poverty headcount depends on modality, region, and the extent to which the control arm “catches up” in the respective region.

In the North, the impact on poverty headcount during the program for the Food arm was of a magnitude that the control group was able to catch up to after 4 years, thus impacts were not sustained at 4yPP. However also in the North, impacts of Cash, which were similar-sized to those of Food during the program, were sustained because poverty headcount in this group continued to decrease post-program. For the Cash+BCC group, impacts were also sustained but for different reasons; poverty did not continue to decrease post-program in this group, and in fact increased slightly, however, impacts were sustained because impacts during the program were so large that the control arm was not able to

catch up 4 years later. In the South, all reductions in poverty headcount from the treatment arms relative to the control group at endline were no longer sustained four years after transfers ended, because poverty headcount in the control group decreased enough to catch up to all of these; although impacts of Food+BCC were large during the program, and poverty headcount in this group remained lower than among the control group at 4yPP, the gap was no longer statistically significant.

5.1.2 Depth and severity of poverty

Our analysis has thus far concentrated on the share of households considered poor as measured by the headcount ratio, either at one point in time or over time. However, many households may well be better off or “less poor” as a result of the intervention even without crossing the specific threshold of the poverty line. To investigate whether households are less poor on a continuous scale, we look at “how far” households are from the poverty line, as measured by the depth and severity of poverty.

Table 3 reveals patterns by modality and region that are similar to those on poverty headcount. At endline, in both the North and South, all modalities significantly reduce both the depth and severity of poverty, with the +BCC arms leading to the largest reductions. By 4yPP, only the Cash and the Cash+BCC arm in the North and the Food+BCC arm in the South continue to significantly reduce the depth and severity of poverty.

5.2 Poverty transitions

While the above analysis reveals the share of households in poverty at a given point in time for a given intervention arm, it does not tell us how a given household transitions in and out of poverty across rounds. For example, it does not reflect the share of households who are sustainably moving out of poverty versus the share that fall back into poverty after the program ends. From Figure 3, we observe that the headcount index does not change meaningfully from endline to 4yPP for the Food arm in the North; but we cannot tell whether this is because households that moved out of poverty during the program stayed out of poverty 4 years later and no new households moved out after the program ended, or whether some of these households fell back into poverty while others moved out after the program ended. To better understand these patterns, we turn to transition matrices.

Figures 4a and 4b represent visually the proportion of households in each intervention arm that experience each transition category, by region; Tables 4a and 4b show corresponding means and p-values for differences across arms, with categories sequenced by baseline poverty status. In the figures, all transition categories in which households are poor at 4yPP are shown in a shade of red, while all transition categories in which households are non-poor at 4yPP are shown in a shade of green.

Starting with the North in Figure 4a, we make a number of observations. First, the portion of each arm shown in a shade of red reiterates the findings on poverty headcount; by 4yPP, similar shares of households are poor in the Control and Food arms, while smaller shares of households are non-poor in the Cash and Cash+BCC arms. Second, Figure 4a and Table 4a show that the share of households that is chronically poor over the three rounds (PPP) is similar between the Control and Food arms (43 percent and 38 percent), while the share is smaller among households in the Cash and Cash+BCC arms (29 percent and 24 percent). Third, the figure gives insight into why Food has similar impacts to Cash on poverty at endline, but smaller effects on poverty by 4yPP. Food and Cash enable similar shares of initially poor households to move out of poverty during the program and stay out (14 percent and 15

percent in PNN), and these are both significantly larger than in the Control group (8 percent). However, focusing on initially poor households that receive Food and Cash and nonetheless remain poor during the program, Cash enables a larger share to move out poverty *after* the program (21 percent vs. 13 percent in PPN). In other words, in the North, the key difference between Food and Cash appears to be among those who are poor at baseline and endline; a larger share among Food become PPP, while a larger share among Cash become PPN. It is *not* the case that, among initially poor households that move out of poverty, Food leads more to fall back into poverty at 4yPP than the Cash arm (i.e., it is not that the proportion of PNP is larger among Food than Cash). Fourth, among poor households at baseline that receive Cash+BCC, a much larger share moves out of poverty during the program and stays out (25 percent in PNN) than among Food or Cash. However, it is notable that a larger share of Cash+BCC is also transient nonpoor (17 percent in PNP), meaning they move out of poverty during the program but fall back after the program ends. Overall, among poor households at baseline that move out of poverty during the program, about 40 percent of those in Cash+BCC fall back into poverty ($0.17/(0.17+0.25)$); a similar share of about 42 percent do so among the Cash arm ($0.11/(0.11+0.15)$). The reason Cash+BCC has a larger share in the PNN category than other arms is that it moves a much larger share of poor households at baseline out of poverty during the program; although a substantial proportion of these fall back into poverty after the program, this still leaves a larger share in PNN. Overall, in the North, the provision of cash appears to serve the role of promotion out of poverty; the addition of BCC amplifies this role.

We then turn to the South in Figure 4b and Table 4b and make a number of linked observations. First, compared to the North, the smaller portion of the Control arm shown in a shade of red reiterates that due to poverty being relatively low even among the South's control group at 4yPP, there is smaller potential for program impacts on poverty by 4yPP. Second, Figure 4b and Table 4b show that the share of households that is chronically poor over the three rounds (PPP) is similar between the Control, Food, and Cash arms (14 to 19 percent), while the share is smaller only among households in the Food+BCC arm (about 8 percent). Third, the Control group has a large share of households in PNN (about 20 percent); unlike in the North, the shares of PNN households from Food or Cash in the South (23 percent and 24 percent respectively) do *not* significantly differ from the Control group. Only the Food+BCC arm has a significantly larger share of households in the PNN category (about 27 percent). Fourth, as in the North, we see Food and Cash have similar shares of households that moved out during the program and stayed out (PNN); however, unlike the North, there is no difference between Food and Cash in the share of households that moved out of poverty after the program (PPN). Thus, in the South, a reason we do *not* see differences in 4yPP poverty between Food and Cash is that, unlike in the North, Cash does *not* lead to more households that are poor at baseline and endline moving out of poverty after the program. Fifth, comparing Food+BCC and Control arms and focusing on those who are poor at baseline, there is a much larger share within the Control group that stay chronically poor over all three rounds (PPP) as noted above or that move out of poverty only after the program (PPN); the Food+BCC arm has a larger share that move out during the program, leading to significantly more staying out at 4yPP (27 percent in PNN) as well as more that are transiently nonpoor (11 percent in PNP). Sixth, comparing Food+BCC and Control arms and focusing on those who are *non-poor* at baseline, there is a much larger share within the Food+BCC group that remain never poor over all three rounds (30 percent in NNN, relative to 20 percent), whereas the Control group has more that fall into poverty either transiently during the program (NPN) or staying poor afterward (NPP). The Food and Cash arms do not differ significantly from Control arms in the share of NNN households. Thus, in the South, where substantial shares of

households transition from poor to non-poor even in the control group, transfers alone do not sustain impacts on poverty, but the combination of transfers and BCC serves roles of both sustained prevention of falling into poverty and promotion out of poverty.

5.3 Calvo-Dercon poverty score

The transition matrices above demonstrate that households move in and out of poverty over time. To investigate the impact of TMRI on an aggregate measure of poverty over this entire time period, rather than at each point in time, we use the Calvo-Dercon (2007) poverty score where, as discussed in Section 3, a lower Calvo-Dercon number implies a reduction in poverty. Table 5 reveals that both Cash and Cash+BCC reduce the poverty score in the North by 11.9 and 20.9 percent respectively, and the impact of the Cash+BCC group is significantly different from that of the Food and Cash groups. In the South, only Food+BCC reduces this metric, by 25.8 percent compared to the control group mean. Food transfers have no impact on the Calvo-Dercon poverty score. In sum, the Calvo-Dercon measure indicates that while Cash in the North reduces the poverty score, across both regions, the arms combining transfers with BCC reduce the poverty score significantly more than any other arm.

6. Discussion and conclusions

6.1 Summary of results

Our results show that, in the North, Cash+BCC leads to large, sustained reductions in poverty that persist 4 years after the intervention ends. This pattern shows up in measures of poverty headcount, depth, and severity at 4yPP, as well as the Calvo-Dercon poverty score that aggregates across our three rounds. Transition matrices across the three rounds show that Cash+BCC led to a large share of initially poor households moving out of poverty during the program (42 percent); although some later fell into poverty after the program (17 of the 42 percent), and the control group also reduced poverty after the program, a sufficient share stayed non-poor at 4yPP (25 of the 42 percent) to yield significant sustained reductions in post-program poverty.

In the South, Food+BCC also appears to lead to sustained reductions in poverty that persist 4 years after the intervention ends. These reductions are smaller than those seen from Cash+BCC in the North and are more sensitive to how we assess poverty and sustainability. In particular, reductions in poverty headcount, depth, and severity are weakly significant or statistically insignificant, while reductions in the Calvo-Dercon poverty score are highly significant. Transition matrices show that Food+BCC leads to a large share of initially poor households moving out of poverty during the program (38 percent), although this is slightly smaller than Cash+BCC in the North; 11 of these 38 percent later fall into poverty after the program, and the control group substantially reduces poverty after the program. Thus, the share that stays non-poor at 4yPP does not significantly differ from the control group at 4yPP itself. However, a smaller share stays chronically poor across the rounds, and a larger share stays chronically non-poor across the rounds.

Food transfers in both regions reduce poverty during the intervention but have no sustained impacts after the intervention ends. This pattern is consistent across measures of poverty headcount, depth, and severity, as well as the measure of the Calvo-Dercon poverty score. In both regions, food transfers cause a significant share of initially poor households to become non-poor during the program; however by 4yPP the control group has caught up.

Cash transfers play out differently across the regions. In the North, Cash leads to sustained reductions in poverty, as measured by poverty headcount, depth, and severity at 4yPP, as well as the Calvo-Dercon poverty score. In the South, Cash leads to no significant sustained reductions in any measure of poverty. Transition matrices show that the impacts of Cash were similar to Food in both regions during the program; however only in the North, and not in the South, the Cash arm led more households that were poor at both baseline and endline to move out of poverty at 4yPP than the Food arm did.

6.2 Possible mechanisms for results

Some broad points can be made. In our study settings, combining transfers with BCC led to sustained reductions in poverty in both regions. Food transfers alone did not appear to have sustained impacts on poverty in either region. Cash transfers alone did have sustained effects, but this was limited to the North, and effects appeared smaller than from transfers combined with BCC.

Why do we see these patterns by modality, region, and presence of complementary programming? Our design does not allow us to disentangle all possible explanations; for example, in comparing the effects of Cash+BCC in the North and Food+BCC in the South, we cannot distinguish the role of modality from the role of region. However, several possibilities are suggested by our findings. To organize our thinking, we focus on the arm that received Cash in the North. We can compare it against Food in the North, to understand the potential role of modality; we can compare it against Cash in the South, to understand the potential role of region; we can compare it against Cash+BCC in the North to understand the potential role of BCC. We can then consider implications for the study arms as a whole.

First comparing Cash in the North vs. Food in the North, we consider the question, why might cash have allowed for more sustainable poverty reduction than food? Our poverty transitions suggest the explanation does *not* seem to be that among households lifted out of poverty during the program, a larger share of those receiving food than cash subsequently fell back into poverty after the program (i.e., Food and Cash do not show significant differences in the PNN transition). Rather treatment households who were still poor during the program appeared more likely to move out *after* the program if they received cash than if they received food (i.e., Cash had a larger share of households in the PPN transition category, whereas Food had a larger share in the PPP transition category). This pattern suggests a potential role for investment – for example, in physical assets – that transfers facilitated during the program but that took time to bear fruit. Potentially cash transfers are more readily leveraged into this kind of investment than food transfers. Prior endline findings support this possibility. Comparing the endline impacts of Cash vs. Food on assets (in aggregate and by asset type), Ahmed et al (2019b) find larger point estimates from Cash.

Next, we compare Cash in the North vs. Cash in the South, to address the question, why does the advantage of cash relative to food play out in the North, but not in the South? One possibility that builds on the above is that there may be more high-return investments available to our sample in the North. This difference could be due to fundamental features of the context; for example, it is likely that agroecological conditions in the North make investments in agriculture higher-return than in the South, and these types of investments may be among those more accessible to the poor. Alternatively, the difference could be due to the conditions of the regions at the particular time of our study; for example, lower poverty within the South at baseline may mean more high-return investments have already been taken advantage of by our sample on average. In either case, the implication could be that cash

facilitates investment among the poor better than food, but cash only *leads* to greater investment if sufficiently high-return opportunities are available. Endline findings also support this possibility, as Ahmed et al (2019b) find stronger endline impacts on asset ownership from Cash in the North than Cash in the South, and asset ownership in the North is focused on agriculture (for example, in livestock, or poultry), consistent with our understanding that the South is less agroecologically conducive to livestock and poultry-rearing.

Taken together, the prior comparison by modality and the current comparison by region point to a potentially important role for assets. Figure 5 shows suggestive evidence consistent with this possibility. The figure traces the trajectory of the median value of assets for households in each poverty transition category, pooled over all arms and both regions, across baseline, endline, and 4yPP. We first note that median assets at 4yPP for all categories that are non-poor at 4yPP (NNN, NPN, PNN, PPN; in shades of green) are clustered above median assets at 4yPP for all categories that are poor at 4yPP (PPP, NPP, PNP, NNP; in shades of red). Moreover, visual comparisons suggest that, within each pair of transition categories that have the same poverty status at baseline and endline, the category that becomes non-poor at 4yPP tends to have higher median assets at endline than the category that becomes poor at 4yPP. For example, comparing PNN to PNP, we see PNN appears to have higher median assets at endline; comparing PPN to PPP, we see PPN appears to have higher median assets at endline. Although we cannot conclude from this descriptive figure that the relationships between assets and poverty are causal, it is suggestive that the two may be linked.

Finally, we compare Cash in the North vs. Cash+BCC in the North, to consider the questions, why does the addition of complementary BCC strengthen the sustainability of poverty reduction, and why does it appear to lead to larger reductions in poverty soon after intervention? One possibility consistent with the above is that the addition of BCC helps to expedite and bolster investments when they are available. Possibly this pattern could come through the BCC improving women's agency and other dimensions of psychological well-being, due to the group-based platform of the BCC and consistent with evidence on the role of women's groups for empowerment (Brody et al., 2016). Indeed, prior evidence on TMRI shows that women receiving BCC reported greater agency at endline (Roy et al., 2019a). Supporting quantitative and qualitative work suggests these improvements may be driven by increases in women's social capital from the BCC (Hoddinott et al., 2017; Roy et al., 2019a) – particularly in light of poor rural women in Bangladesh tending to be socially excluded and isolated due to socioeconomic conditions and sociocultural norms in the absence of such an intervention. Evidence shows that psychological well-being can shape forward-looking investment behavior (Dean, et al., 2017). Although evidence suggests that cash transfers themselves can also improve psychological well-being in such a way that promotes more forward-looking behavior, it is plausible that the addition of BCC amplified and expedited these effects. These insights can then generalize to the comparison of Food vs. Food+BCC in the South; the addition of BCC may have bolstered psychological well-being sufficiently to promote investment and sustain some degree of poverty reduction despite a less favorable modality and context than Cash+BCC in the North.

6.3 Implications and future work

Our findings imply that, when we consider allocation of public resources with respect to social safety nets, there is not *necessarily* a tradeoff between protective and preventative programming on one hand versus promotional programming on the other. However, the extent to which this is true can

depend on context (how poor a geographic region is on average over the intervention period, as well as what kind of investment opportunities are available to the poor); the choice of transfer modality (cash may better facilitate investment than food); and the presence of complementary programming (group-based training for women appears to expedite investment, possibly through increasing women's empowerment or psychological well-being).

The results from TMRI show parallels to the body of work on “big push” graduation models (Banerjee et al., 2015). In pilot projects in Ethiopia, Ghana, Honduras, India, Pakistan, and Peru, interventions that target the ultra-poor with a combined package – a productive asset grant, training and support, life skills coaching, temporary cash consumption support, and typically access to savings accounts and health information or services – have been shown to cause sustained improvements in income and other measures of well-being both 1 year and 3 years after programming ended. Although these projects are costly, they are shown to be cost-effective in study contexts given the large benefits.

TMRI's findings also suggest potential from a multifaceted approach; we find sustainable poverty reduction is strongest through a combination of significant resources and complementary programming to the poor. The model of using social safety nets as a platform for graduation is also promising to explore, given that social safety net programs are continuing to scale up in many countries around the world (Ravallion, 2016; World Bank, 2018). There are also potential benefits around the flexibility of providing cash transfers; in lieu of needing to select a productive asset that is contextually appropriate and meets the preferences of the household, providing cash allows households to allocate resources and choose investments as they prefer. Further, cash can be delivered electronically, which may reduce the costs of scaling up. In terms of the BCC, although TMRI's model was intensive and would not be straightforward to scale as implemented, lighter-touch versions of group-based training for women are promising to scale and evaluate. Moreover, although the cost of TMRI's specific model of BCC was not insubstantial at approximately \$50 per participant per year (Ahmed et al., 2016), prior evidence shows the addition of BCC led to a range of other benefits in addition to sustained poverty reduction, which increase cost-effectiveness; these include reducing intimate partner violence even after the program ended (Roy et al., 2019a; Roy et al., 2019b), improving psychological well-being (Roy et al., 2019b), improving child nutrition (Ahmed, et al., 2019a; Hoddinott et al., 2018), and improving neighbors' knowledge and practices around nutrition (Hoddinott et al., 2017). Taken together, our findings suggest that social safety nets can be a promising platform on which to leverage graduation from poverty. Comparing approaches of asset-based “big push” graduation programs and cash-based social safety net programs with group-based training, at equal cost from the implementer perspective, would be a promising area for future research.

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Tables and figures

Table 1: Attrition from baseline to 4-year-post-program, by intervention arm and region

	North	South
Cash	0.01 (0.02)	-0.02 (0.02)
Food	0.01 (0.02)	0.02 (0.03)
Cash+BCC	0.04 (0.03)	
Food+BCC		-0.01 (0.02)
Constant/Control group	0.10 (0.02)***	0.09 (0.01)***
R^2	0.00	0.00
N	2,000	2,000
P-value: Transfers = Transfers+BCC		
P-value: Cash = Cash+BCC	0.23	
P-value: Food = Food+BCC		0.22

OLS coefficients reported. Standard errors clustered at the village level. * $p < 0.1$ ** $p < 0.05$; *** $p < 0.01$

Table 2: Impact of intervention arms on poverty headcount at endline and 4-year-post-program, by region

	North		South	
	Headcount at endline	Headcount at 4yPP	Headcount at endline	Headcount at 4yPP
Cash	-0.14 (0.03)***	-0.09 (0.04)**	-0.09 (0.04)**	0.00 (0.04)
Food	-0.12 (0.03)***	-0.00 (0.04)	-0.11 (0.04)***	0.03 (0.04)
Cash + BCC	-0.34 (0.04)***	-0.12 (0.04)***		
Food + BCC			-0.23 (0.03)***	-0.06 (0.04)
R^2	0.11	0.04	0.07	0.03
N	1,763	1,763	1,820	1,820
Mean of Control	0.73	0.60	0.49	0.34
P-value: Cash=Cash/Food +BCC	0.00	0.44	0.00	0.07
P-value: Food=Cash/Food +BCC	0.00	0.00	0.00	0.01
P-value: Cash=Food	0.63	0.02	0.53	0.46

Standard errors clustered at the village level. All estimations control for baseline outcome. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.
 EL denotes endline, 4yPP denotes 4-year-post-program.

Table 3: Impact of intervention arms on depth and severity of poverty at endline and 4-year-post-program, by region

	North				South			
	Depth at endline	Severity at endline	Depth at 4yPP	Severity at 4yPP	Depth at endline	Severity at endline	Depth at 4yPP	Severity at 4yPP
Cash	-0.06 (0.01)***	-0.02 (0.00)***	-0.02 (0.01)*	-0.01 (0.01)*	-0.02 (0.01)***	-0.01 (0.00)***	0.00 (0.01)	0.00 (0.00)
Food	-0.04 (0.01)***	-0.02 (0.00)***	-0.00 (0.01)	-0.00 (0.01)	-0.03 (0.01)***	-0.01 (0.00)***	0.01 (0.01)	0.00 (0.00)
Cash + BCC	-0.12 (0.01)***	-0.05 (0.00)***	-0.04 (0.01)***	-0.01 (0.01)***				
Food + BCC					-0.06 (0.01)***	-0.02 (0.00)***	-0.01 (0.01)*	-0.00 (0.00)*
<i>N</i>	1,763	1,763	1,763	1,763	1,820	1,820	1,820	1,820
Mean of Control	0.19	0.07	0.14	0.04	0.10	0.03	0.06	0.01
P-value: Cash=Cash/Food +BCC	0.00	0.00	0.18	0.38	0.00	0.00	0.03	0.03
P-value: Food=Cash/Food +BCC	0.00	0.00	0.00	0.02	0.00	0.00	0.01	0.02
P-value: Cash=Food	0.12	0.12	0.13	0.14	0.91	0.93	0.67	0.81

Standard errors clustered at the village level. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Estimations done by tobit regressions with censored lower limit of 0. Coefficients presented are average marginal effects (dy/dx). EL denotes endline, 4yPP denotes 4-year-post-program.

Table 4a: Poverty transitions across baseline, endline, and 4-year-post-program, by intervention arm: North

	Means				p-values of difference		
	Control	Food	Cash	Cash+BCC	Food-Control	Cash-Control	Cash+BCC-Control
Chronic poor (PPP)	0.43	0.38	0.29	0.24	0.29	0.00	0.00
Moved out after project (PPN)	0.16	0.13	0.21	0.13	0.18	0.13	0.13
Transient nonpoor (PNP)	0.08	0.11	0.11	0.17	0.10	0.09	0.00
Moved out during and stayed out (PNN)	0.08	0.14	0.15	0.25	0.01	0.00	0.00
Fell into during project and stayed poor (NPP)	0.06	0.05	0.04	0.02	0.51	0.07	0.00
Transient poor (NPN)	0.07	0.04	0.05	0.02	0.06	0.27	0.00
Fell into after project (NNP)	0.03	0.05	0.07	0.05	0.05	0.00	0.07
Never poor (NNN)	0.09	0.10	0.08	0.12	0.71	0.95	0.14

Sample of 1763 households. Poverty transition categories in parentheses describe households' poverty status at baseline (first letter), endline (second letter), and 4-year-post-program (third letter), where P denotes poor, and N denotes nonpoor.

Table 4b: Poverty transitions across baseline, endline, and 4-year-post-program, by intervention arm: South

	Means				p-values of difference		
	Control	Food	Cash	Food+BCC	Food-Control	Cash-Control	Food+BCC-Control
Chronic poor (PPP)	0.19	0.18	0.14	0.08	0.74	0.12	0.00
Moved out after project (PPN)	0.17	0.12	0.14	0.11	0.14	0.37	0.02
Transient nonpoor (PNP)	0.07	0.10	0.09	0.11	0.10	0.19	0.04
Moved out during and stayed out (PNN)	0.20	0.23	0.24	0.27	0.28	0.16	0.05
Fell into during project and stayed poor (NPP)	0.04	0.02	0.05	0.01	0.24	0.65	0.02
Transient poor (NPN)	0.10	0.06	0.08	0.05	0.01	0.31	0.00
Fell into after project (NNP)	0.04	0.07	0.06	0.07	0.05	0.15	0.11
Never poor (NNN)	0.20	0.21	0.21	0.30	0.77	0.89	0.00

Sample of 1820 households. Poverty transition categories in parentheses describe households' poverty status at baseline (first letter), endline (second letter), and 4-year-post-program (third letter), where P denotes poor, and N denotes nonpoor.

Table 5: Impact of intervention arms on Calvo-Dercon poverty score (baseline, endline, 4-year-post-program), by region

	North	South
Cash	-0.21 (0.07)***	-0.08 (0.07)
Food	-0.10 (0.08)	-0.04 (0.08)
Cash + BCC	-0.37 (0.08)***	
Food + BCC		-0.31 (0.07)***
R^2	0.02	0.02
N	1,763	1,820
Mean of Control	1.77	1.20
P-value: Cash=Cash/Food +BCC	0.03	0.00
P-value: Food=Cash/Food +BCC	0.00	0.00
P-value: Cash=Food	0.16	0.56

Standard errors clustered at the village level. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Figure 1: Sample flow

Figure 2: Visualizing poverty transitions

Figure 3: Poverty Headcount at Baseline, Endline, 4-year post-program – by intervention arm and region

Figure 4a. Poverty transitions across baseline/endline/4-year-post-program, by arm: North

Figure 4b. Poverty transitions across baseline/endline/4-year-post-program, by arm: South

Figure 5. Median log assets at baseline, endline, 4-year post-program – by poverty transition category

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