Online appendix I: Pre-Analysis Plan

October 10, 2017

Abstract

The study proposes to re-interview households that were part of the Government of Zambia's (GoZ) Child Grant Programme (CGP) impact evaluation. These households (N=2500) were interviewed at baseline in 2010, and subsequently re-interviewed in 2012, 2013 and 2014. The study design was a randomized control trial (RCT), with half of the households randomly assigned to control status and half to treatment status. The evaluation demonstrated that the CGP had a transformative effect on participant households, with large and significant increases in consumption, crop production and non-farm enterprises. The CGP is estimated to have generated a multiplier of approximately 1.52—each Kwacha transferred eventually generated an additional 0.52 worth of benefits to the households through increased productivity and income.

In 2015 the GoZ consolidated several demonstration cash transfer programs into one national 'inclusive' model and began a rapid scale-up (see Appendix A for old and new programme eligibility criteria). New districts were targeted, and beneficiaries in demonstration districts were slowly re-targeted as well. This study will return to the study households in 2017, seven years after they first started receiving transfers, and two years after the consolidation process began. The objective is to see whether the large multiplier effects of the programme have been sustained, or whether households, in the absence of the programme, have returned back to their pre-programme levels of consumption and economic activity.

Research questions and hypotheses

Can unconditional cash transfers (UCTs) to the ultra-poor lead to sustained poverty reduction? Or do the impressive impacts generated by such programs fade-away once transfers stop? We will answer this question by taking advantage of the reform of the cash transfer portfolio in Zambia in 2014 (which was implemented in 2015) where a significant number of households were no longer eligible for a UCT after five years. Two large RCTs reported significant protective and productive effects of the UCT on households, with estimated multiplier effects in the range of 1.5. Do these effects persist two years after the programme ended? What has happened to consumption, asset accumulation and productive activity among the households that are no longer on the program? Answering these questions will help us understand whether UCTs represent a viable option for governments to address current and future poverty or whether these programs simply address short-term protection without representing a real pathway out of poverty. These answers are crucial for efforts to address SDG 1, ending poverty in all its forms everywhere, through (in part) the implementation of national social protection systems. What form should these social protection systems take? Are some interventions (UCTs) better able to address short-term protection outcomes only, thus requiring additional interventions to directly enhance livelihoods?

Our specific research questions are described below We will compare the following sets of outcomes between these two groups: 1) household consumption, food security; 2) productive activity (crop production, non-farm enterprise, wage employment); 3) asset accumulation (livestock holdings, savings, durable goods).

Sampling

The initial impact evaluation of the CGP that this study builds on was a multisite RCT conducted in the three programme districts of Kalabo, Shangombo and Kaputa. An inception meeting to discuss and agree upon evaluation design options was held in June 2010 at the MCDMCH, and included provincial and district social workers from the programme sites. Subsequently the ministry conducted the first step of the randomization process by selecting 30 CWACs[1] within each district, out of roughly 100 CWACs in each district, to enter into the study through a lottery held at the Ministry headquarters. This process created transparency and understanding about how the communities were selected for everyone involved in implementing the programme.

After the 90 CWACs (30 from each district) were randomly selected for the study, targeting in each study CWAC was undertaken. Ministry staff (social welfare officers), CWAC members and staff from the district health services (nurses, community health workers) identified all eligible households with at least one child under 3 years old in the study communities. The identification process entailed house to house visits, coupled with public awareness campaigns. This process resulted in more than 100 eligible households in each CWAC on average. From this master list, 28 households were randomly sampled from each CWAC for inclusion in the study with 4 additional households per CWAC kept in reserve in case of refusals.

Baseline data was collected in October 2010 on 2515 households. After the baseline was completed, random assignment to study arms was conducted in public with local officials, Ministry staff, and community members present as witnesses. Controls were drawn from the same districts as treatment CWACs. Note that because baseline data collection occurred before CWACs were randomly assigned to treatment or control conditions, study participants and enumerators were both blinded at baseline.

The CGP evaluation also included 4 post-intervention waves at 24, 30, 36 and 48 months. All surveys were conducted in October-November to control for seasonality, except for the 30-month survey, which was purposely collected during the harvest season to assess consumption smoothing effects. As stated earlier, the baseline was conducted in 2010; the final follow-up to date took place in 2014. Evaluation reports are available at https://transfer.cpc.unc.edu/?page_id=1262, along with all survey instruments and related documentation.

As mentioned in the proposal document, the GoZ reformed its cash transfer programs and consolidated all programs into one unified approach. The eligibility criteria is poor households (identified via a proxy means test) in demographic categories: 1) disabled or chronically ill member; 2) high dependency ratio; 3) elderly; 4) youth-headed households (more details in Appendix A). Consequently, our original study sample will not all qualify for the new program (called Social Cash Transfer Program –SCT- or the inclusive model). The Ministry is currently providing us a list of the eligibility status of our study sample. Based on simulations using the stated eligibility criteria, we expect 25 percent of our sample to qualify for the new program. However, the new program has not yet rolled out in the two districts of Shangombo and Kalabo. Re-targeting has just commenced now, and CGP households continued to receive transfers through February 2017.

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[1] CWACs represent village clusters

Attrition

Although this study is an 84-month follow-up, we do not expect significant issues with attrition. We have now returned to the same households four times over more than four years, and more than 96% of the households from baseline remained in the sample at the 48-month follow-up (which is less than 2 percentage points lower than in the 36-month follow-up sample).

Further, when testing for differential attrition at the 48-month follow-up, we found that there was no difference in baseline characteristics between the treatment and control households that remained in the study, meaning that there is no differential attrition and the benefits of randomization are preserved. Household response rates are balanced between the treatment and control groups overall and in each district. We also tested all the household, young child, and older child outcomes measures and control variables for statistical differences at baseline between the treatment and control groups that remain in the 48-month follow-up analysis. Of the 41 indicators, we did not find any to be statistically different. More details on this can be found in the 48-month follow-up report,[2] but the trend is reassuring and we expect to see similar low, non-differential attrition rates at this follow-up.

Further, what attrition did occur is easily explained, as 40% of the missing households come from one study district, Kaputa. This was also the case for the 24-month and 36-month follow-ups, where Kaputa had the highest percentage of missing households among the three districts. In particular, in the 24-month wave of data collection, most of the attrition in Kaputa occurred because Cheshi Lake was drying up, forcing households that relied on the lake for fishing and farming at baseline to move their homes as they followed the edge of the lake inward. Some households that relocated during the 24-month follow-up survey returned, so attrition was lower at the 36-month survey. This problem in Kaputa affected treatment and control households equally, as shown by the lack of differential attrition by treatment status. This will potentially take place again for the 84-month follow-up; however, as shown previously, even when attrition due to the lake effects is high in Kaputa, overall attrition in the sample remains under 5 per cent, which is extremely low for such a long study with this number of waves.

Instruments

- CGP 84-month household questionnaire
- CGP 84-month community questionnaire
- CGP health facility questionnaire

Variables

We plan to replicate the analysis reported in a working paper by Handa et. al.[3], which looked at results for almost 40 outcome variables at the household, woman and child level, which are listed in Table 1, grouped into domains. The definition of each indicator is shown in Table 2. The CGP was a national programme evaluated under contract, and so the programme's stated objectives and associated results framework, both of which go through a transparent process, provide the guidance for the key outcomes to be tracked. The programme's stated objectives relate to food security and consumption, asset

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[2] https://transfer.cpc.unc.edu/wp-content/uploads/2015/09/Zambia-CGP-48-Mo-Report.pdf

[3] Handa, Sudhanshu, et. al. Can Unconditional Cash Transfers Lead to Sustainable Poverty Reduction? Evidence from two government-led programmes in Zambia. https://www.unicef-irc.org/publications/858/

ownership, children's material well-being and children's schooling, and reduction in malnutrition among pre-school children. The key indicators associated with these objectives were identified prior to baseline in order to inform questionnaire design. This study's main objective, as agreed upon with GoZ, is to assess the long-term economic effects of the CGP, so the instrument focused on collecting economic indicators, and ancillary indicators that help us understand the pathway through which economic impacts are achieved.

Table 1: CGP evaluation indicator list by wave and domain

			Baseline	24-months	36-months	84-months
CONSUMPTION	Overall per capita consumption*	Household (pc)	x	x	x	x
	Food consumption		x	x	x	x
	Non-food consumption		x	x	x	x
FOOD SECURITY	Does not or rarely worry about food	Household	x	x	x	x
	Able to eat preferred food		x	x	x	x
	Does not or rarely eat food he/she does not want to eat due to lack of resources		x	x	x	x
	Does not, or rarely, eat smaller meal than needed		x	x	x	x
	Does not, or rarely, eat fewer meals because there is not enough food		x	x	x	x
	Never or rarely no food to eat because of lack of resources		x	x	x	x
	Does not, or rarely, go to sleep hungry		x	x	x	x
	Does not, or rarely, go a whole day/night w/o eating		x	x	x	x
	Food security scale (0-24 where higher means more food secure)*		x	x	x	x
ASSETS	Domestic Asset index	Household	x	x	x	x
	Livestock index		x	x	x	x
	Productive index		x	x	x	x
FINANCE / DEBT	Whether woman currently saving in cash	Woman	x	x	x	x
	Amount saved by women		x	x	x	x
	Whether household has new loan	Household			x	x
	Reduction in the amount borrowed				x	x
	Not having an outstanding longer-term loan (loans taken out more than 6 months before the follow-up considered)				x	x
	Reduction in the amount owed				x	x
INCOME AND REVENUES	Value of harvest ZMW	Household	x	x	x[1]	x
	Total crop expenditures		x	x	x	x
	NFEs [operating or not]			x	x	x
	NFEs [revenues]			x	x	x

[1] We use crop figures collected at a special 30-month follow-up which referred to the same crop season that the 36-month follow-up would have referred to.

Table 1: CGP evaluation indicator list by wave and domain (continued)

Domain	Indicator	Unit				
RELATIVE (and/ or subjective) POVERTY	Not considering household very poor	Household	x	x	x	x
	Better off compared to 12 months ago		x	x	x	x
	Think life will be better than now in either 1, 3 or 5 years	Woman	x	x	x	x
MATERIAL NEEDS	Shoes		x	x	x	x
	Blanket	Child	x	x	x	x
	Two sets of clothes	(5-17)	x	x	x	x
	All needs met*		x	x	x	x
SCHOOLING	School enrolment	Child	x	x	x	x
	Days attended in prior week	(11-17)	x	x	x	x
NUTRITION OF YOUNG CHILDREN [CGP only]	Not underweight		x	x	x	
	Not wasted	Child	x	x	x	
	Not stunted	(0-5)	x	x	x	

Table 2: Indicator definitions			
DOMAIN	**Indicators**	**Level**	
CONSUMP-TION	Overall per capita consumption*	Household (pc)	Sum of responses for 217 individual consumption item for food and non-food. Module taken in its entirety from Zambia Living Conditions Monitoring Survey. Recall period ranges from last 7 days for frequent items to last month, last 3 months and last 12 months for less frequent items. Food includes value of own production. All items include value of gifts. Aggregate deflated by household size and further deflated to study baseline (either 2010 or 2011). Logged.
	Food consumption		
	Non-food consumption		
FOOD SECURITY	Does not or rarely worry about food	Household	Reference period is last 4 weeks. Codes are 0=never; 1=rarely (once or twice); 2=sometimes (3-10 times); 3=often (more than 10 times). We turn this categorical variable into a dummy by considering food secure those that never or rarely (codes 0 and 1) experience each one of the 8 situations described.
	Able to eat preferred food		
	Does not or rarely eat food he/she does not want to it due to lack of resources		
	Does not, or rarely, eat smaller meal than needed		
	Does not, or rarely, eat fewer meals because there is not enough food		
	Never or rarely no food to eat because of lack of resources		
	Does not, or rarely, go to sleep hungry		
	Does not, or rarely, go a whole day/night w/o eating		
	Food security scale (HFIAS, 0-24 where higher means more food secure)*		Scale score created by aggregating the responses to the eight individual food security questions
ASSETS	Domestic Asset index	Household	Computed by PCA on number of household assets/livestock/productive assets owned (restricting to assets for which information is available in all waves). The index is then turned positive through a monotonic transformation and then logged
	Livestock index		
	Productive index		
FINANCE / DEBT	Savings, extensive margin	Woman	Binary variable equals to 1 if woman is currently saving in cash
	Savings, intensive margin		Amount saved by women in the last month
	Whether household has new loan	Household	In the last year did you or anyone in the household borrow money from any person or institution?
	Reduction in the amount borrowed		How much did your household borrow overall from each source, in the last 6 months?

	Not having an outstanding longer-term loan (loans taken out more than 6 months before the follow-up considered)		Does your household still owe money for any loan contracted before …? (6 months before follow-up considered)
	Reduction in the amount owed		How much does your household still owe?

Table 2: Indicator definitions (continued)

INCOME AND REVENUES	Value of harvest ZMW	Household	
	Total crop expenditures		
	NFEs [operating or not]		Did you operate any non-farm enterprises or provide any services (store, transport, home brewing, trade, etc.) in the last 12 months
	NFEs [revenues]		Total revenue from these businesses in an average month
RELATIVE (and/or subjective) POVERTY	Not considering household very poor	Household	Do you consider your household to be non-poor, moderately poor or very poor?
	Better off compared to 12 months ago		Compared to 12 months ago, do you consider your household to be better off, the same or worse off now?
	Think life will be better than now in either 1, 3 or 5 years	Woman	Do you think your life will be better in […] from now? - 1 year - 3 years - 5 years In this case the variable, is a dummy equals to one If any of the three questions reported above is equal to one.
MATERIAL NEEDS	Shoes	Child (5-17)	Does […] have a pair of shoes?
	Blanket		Does […] have a blanket? (either shared or owned)
	Two sets of clothes		Does […] have at least two sets of clothes?
	All needs met*		Dummy variable equals to 1 if the child has all the above needs (shoes, blanket, clothes) met.
SCHOOLING	School enrolment	Child (11-17)	Is […] currently attending school?
	Days attended in prior week		How many days did […] attend in the past week?

Multiple Hypothesis Testing

Providing estimates on multiple indicators across a range of domains guards against the selective reporting of only those estimates that are statistically significant. On the other hand, with so many estimates we may find false positives just because of the sheer number of tests computed. We take two approaches to account for this multiple testing. First, for each family of outcomes, we will adjust p-values using the Sidak-Bonferroni adjustment (Abdi 2007). Second, we will build summary indexes as 'lead indicators' for each domain following Anderson (2008) and Kling et al. (2007). Specifically, for each domain with the exception of consumption, food security and child material needs, the summary index will be computed as the equally weighted average of z-scores of each indicator within the domain, then standardized against the control group within each round[2]. In the case of consumption, food security and child material needs, we will simply standardize total consumption, the food security scale and "all child needs met" indicators as these are already summary statistics for that particular domain.

Treatment effects

The key identification assumption is that control households are identical to intervention households and that there are 'parallel trends' in the two study arms. Baseline balance was tested for over 200 variables and is presented in the baseline evaluation report, available at https://transfer.cpc.unc.edu/?page_id=1262. Overall, we found that less than 5 percent of the mean differences are significant, indicating that randomization was successful.

As mentioned earlier, the latest round of the evaluation is based around the retargeting of the programme. This retargeting of households took place in Kaputa district in 2015. CGP households received their last payment under that programme in January-February 2015, and households eligible for the new programme began receiving transfers in June 2015. Initial estimates suggest that about 25 percent of CGP households qualified for the new programme.

Retargeting occurred in Shangombo and Kalabo in July-September 2017, and validation is scheduled to take place in October-November 2017, just as we undertake field work in those districts. The last CGP payment for households happened in January-February 2017. Thus our treatment group in these districts will have received transfers for six years (2011-2017). The control group will not have received any transfers, as even those that are eligible for the new programme would not have yet received their initial payment at the time of the survey. Table 3 lists the different scenarios we expect to find in the study. We estimate that 25 percent of CGP households will be eligible for the new programme.

These scenarios open up a number of option to identify treatment effects of the CGP, and to investigate the specific issue of 'graduation' or long-term sustained impacts of the programme. Our cleanest and most promising comparison is in Kaputa, comparing original T households that were not eligible for the new programme with original C households who were likewise not eligible. These households should be

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[2] Following Kling et al. (2007:89), we treat missing values as follows: "If an individual has a valid response to at least one component measure of an index, then any missing values for other component measures are imputed at the random assignment group mean. This results in differences between treatment and control means of an index being the same as the average of treatment and control means of the components of that index (when the components are divided by their control group standard deviation and have no missing value imputation), so that the index can be interpreted as the average of results for separate measures scaled to standard deviation units."

the same in terms of key demographic characteristics and sample size should also be sufficient (N=~630). The research question answered here is whether the effects of the CGP are sustained 30-32 months after leaving the programme. Specifically, non-eligible households in T CWACS would have received cash transfers from February 2011 through February 2015 (4 years) and not since then. Thus 30-32 months will have elapsed from their last payment to the date of interview, while ineligible households in C CWACS would never have received transfers.

Table 3: Cash transfer receipt scenarios

	Original Treatment	**Original Control**

Kaputa	Eligible for new program
	    2/2011-2/2015
	    6/2015-present
		Eligible for new program
		    6/2015-present

	Not eligible for new program None	Not eligible for new program None

Shangombo, Kalabo	Eligible for new program
	    2/2011-2/2017
	    12/2017-
		Eligible for new program
		    12/2017

	Not eligible for new program
	    2/2011-2/2017
		Not eligible for new program
		    None

A second type of comparison would be in Kalabo/Shangombo, between original T households who are not eligible for the new programme and original C households who are not eligible. In these districts, the last CGP payment was made in February 2017 so 9-10 months will have elapsed between last payment and date of interview. This would give us an idea of whether the effects are sustained 9-10 months after the transfers had stopped. Sample size here is estimated at 1260. Depending on how far the re-targeting process has gone, we might be able to include ALL T and C households in this analysis. For example, if households do not know their eligibility status for the new program, we can rule out anticipation effects and use all households, which would increase the sample size to 1680.

If re-targeting has progressed and households know their eligibility status, but have not yet received any new payments, they would expect to receive them. This could be exploited to test for anticipation effects. Specifically, the original T households might be in a better position (financially) to borrow against future payments relative to the original controls.

In terms of methods, we will use a difference-in-differences model (which nets out any small baseline differences in outcomes) to compare our key outcomes between treatment and control groups. The DD approach assumes parallel trends, which is plausible given that we draw control CWACs from the same districts as treatment CWACS. We have also tested for trends in CWAC level prices over the study period and found no statistical difference in the evolution of prices across arms. We also tested for differences in other exogenous factors such as floods, drought, crop disease and new development projects, and again did not find any differences across study arm.

A key issue in the above analysis is power. Table 1 below is the initial power calculations we provided in the proposal based on Wave 3 data and actual effect sizes. The second last column shows the effective sample size required accounting for the design effect (clustering). These sample sizes are derived based on the actual treatment effects at Wave 3. Consumption is a key outcome variable. The effect size in

Table 1 for consumption is a large 0.33SD for which we require an effective sample size of 1391. In Kaputa we estimate an actual sample size of ~630 and an effective sample size of 144 (630 divided by the design effect of 4.4). Using this sample size with an alpha level of 0.05 and beta of 0.80, we can detect an effect of 0.46SD.

The sample sizes from households in Western province (Shangombo and Kalabo) are larger. In the worst case where households have been told their eligibility status and we only use the non-eligible households, we have a sample size of 1260 and (dividing by 4.4) an effective sample size of 286. With this sample size we can detect an effect of 0.33SD. Since this is the actual observed treatment effect at Wave 3, if this treatment effect is sustained, we have the power to detect it, which is good news. And if we can rule out anticipation effects and use the entire sample in the two districts, the effective sample size is (1680/4.4) 382 and we have power to detect an effect of 0.28SD. Note in Table 1 that the effective sample sizes required for the livestock index is much smaller, so we can detect smaller effects that those for consumption.

Table 1: Power Calculations based on Evaluation Survey

Indicator	Mean			W3 Std. Dev	ICC (rho)	DEF	Effective Req' Sample Size	Actual Sample Size
	Baseline	W3-Treatment	W3-Control					
Consumption pc (ZMW)	40.49	64.3	51.83	39	0.126	4.402	1391	2460
Food consumption pc (ZMW)	30.08	48.23	39.14	30	0.134	4.618	1626	2460
Livestock Index	0.21	0.35	0.18	0.33	0.034	1.918	234	2460
Owns chickens	0.43	0.55	0.39		0.023	1.621	493	2460
Owns cattle	0.10	0.17	0.09		0.01	1.27	704	2460
Owns goats	0.02	0.05	0.02		0.056	2.512	2954	2460

ICC=intra-class correlation; DEF=design effect; 28 households per cluster. Effective sample size is estimated sample size multiplied by design effect. Alpha is 0.05, beta is0.80.

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Appendix to Pre-Analysis Plan: Eligibility criteria changes

The Child Grant Programme (CGP) targeted any household with a child under five years old. Eligible households originally received 55,000 kwacha a month (equivalent to U.S. $11) irrespective of household size, an amount deemed sufficient to purchase one meal a day for everyone in the household for one month. The goal of the CGP was to reduce extreme poverty and the intergenerational transfer of poverty. The objectives of the program (as specified in the child grant manual)) were to (1) supplement and not replace household income; (2) increase the number of children enrolled in and attending primary school; (3) reduce the rate of mortality and morbidity among children under 5 years old; (4) reduce stunting and wasting among children under 5 years old; (5) increase the number of households owning assets such as livestock; and (6) increase the number of households that have a second meal a day.

The Multiple Categorical Cash Transfer Programme (MCP) was another pilot programme rolled out at the same time as the CGP and eventually rolled into the composite revised cash transfer programme after the pilot.

The MCP targeted households that met any of the following conditions:

- A female-headed household keeping orphans
- A household with a disabled member
- An elderly-headed household (over 60 years old) keeping orphans
- A special case: this category is for cases that are critical but do not qualify under the other categories; for example, a household of two elderly people who are unable to look after themselves.

The current scale-up programme refined targeting to reduce exclusion and reduce stigma. Currently, as seen in Figure A1, households must pass a proxy means test (either urban or rural, depending on household location), and meet at least one of the categories listed to be eligible for the grant.

Figure A1: Zambia's Scale-up social cash transfer eligibility criteria

Proxy Means Test	Categorical

household characteristics correlated with welfare levels are used as a proxy for household income

households are categorized into specific groups

Rural

- Type of roofing materials
- Presence of beds
- Presence of basic agriculture tools
- Ownership of chickens

Urban

- Type of light source
- Ownership / type of iron
- Ownership of goats

Disabled
at least one household member has been certified by a medical officer as severely disabled

Chronically Ill on Palliative Care
at least one household member has been certified by a medical officer as chronically ill on palliative care

Elderly
households have at least one member aged 65 years or more

child-focused

Child-headed household
household headed by person aged 18 years or less

Female head with 3+ children
household headed by a female and has 3 or more children aged 18 years or less