THREE ESSAYS ON HOUSEHOLD WELL-BEING IN SUB-SAHARAN AFRICA

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ABSTRACT

Marlous de Milliano: Three Essays on Household Well-being in sub-Saharan Africa
(Under the direction of Sudhanshu Handa)

This dissertation focuses on the relationship between children's height, child development and school attendance in Zambia, and the impact of cash transfer programs on social support in Ghana and Malawi. For the analyses I use data from a seven-year panel, and from two longitudinal mixed-methods program impact evaluations. The first chapter compares height with a broader measure of school readiness focused on skills and ability. I estimate effects of past height-for-age and past school readiness on school attendance using a fixed effects-instrumental variable estimator. Both variables contribute to attendance when estimated separately. When included simultaneously, readiness has an independent positive effect on attendance, while height is insignificant. This suggests that early-life interventions moving beyond growth and addressing child development more holistically can affect future human capital. The second and third chapter are mixed-methods analyses examining whether the introduction of a cash transfer program 'crowds-out' social support from family, friends and neighbors. In Ghana, difference-in-differences estimates show that the perception of social support increased due to the cash transfer. Beneficiary women confirmed these findings in qualitative interviews sharing experiences of increased ability to obtain soft loans and to enter savings groups, and participation in social gatherings for which contributions or appropriate attire were required. In Malawi, I focus on both stress and social support, to understand whether access to the cash transfer and social support mitigates poverty-related stress. Difference-in-differences estimators indicate that the cash transfer decreased stress but did not affect financial social support from persons outside the household. Interviews with beneficiaries provided further insight. The cash transfer helped to reduce food insecurity and stress around children's needs, but

due to its limited size caregivers still needed additional support when the cash transfer ran out. For both programs there is no evidence for crowding-out of social support, which would have resulted in a dilution of program impact due to a reduction in social support. In other words, the cash transfer programs in Ghana and Malawi complemented existing sources of social support and contributed to the overall positive evidence of the impact of cash transfers on household well-being.

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LIST OF ABBREVIATIONS

CGP – Zambia's Child Grant Program

CT – cash transfer

HAZ – Height-for-age z-scores

IDI – in-depth interviews

LEAP 1000 – Ghana's Livelihood Empowerment Against Poverty 1000 program

LPM – linear probability model

MOS-SS– Medical Outcomes Study Social Support

OLS – ordinary least squares

PMT – proxy-means test

RCT – randomized controlled trial

SCT – Malawi's Social Cash Transfer program

INTRODUCTION

This dissertation explores issues related to human and social capital of poor households in sub-Saharan Africa. I use longitudinal data from three different countries (Zambia, Ghana, Malawi), one paper uses a seven-year panel dataset on rural vulnerable households, and two papers use mixed-methods data from impact evaluations of large-scale national cash transfer programs. In my first chapter I study the relationship between childhood malnutrition and early school attendance. The timing of starting school is associated with the total time children spend in school (Wils, 2004), and is therefore key to children's human capital development. In the second and third chapter I analyze the interaction between social support and unconditional cash transfer (CT) programs. These latter two papers explore whether this type of policy intervention strengthens or weakens the existing social support networks. If the CT replaces or 'crowds-out' existing support, the net effect of the intervention will be reduced and may even be completely eliminated. However, if the CT reinforces existing social support networks or enables establishing new connections ('crowding-in') the overall policy impact will be larger. Thus, understanding the relationship between CTs and social support leads to a more complete picture of the program's effects, and in particular, the potential for 'unintended consequences'.

In my first chapter, I explore the relationship between height-for-age, a holistic measure of child development and school readiness, and early primary school attendance. The paper contributes to the current debate on what role physical growth plays in development and later life outcomes. I make use of a unique panel dataset collected among poor, rural households in Zambia and covering a timespan of seven years. In the analysis I use a measure of school readiness alongside height-for-age, which allows me to examine the interaction between the two, and observe how each contribute to school attendance separately. After purging endogeneity from the estimation by using fixed effects, and first differences-

instrumental variable models I find that when controlling for school readiness, height-for-age does not significantly contribute to attendance of children around primary school age in rural Zambia. School readiness, on the other hand, has a positive and significant effect on school attendance. After three years, I observe some lasting effects of school readiness on children's grade-for-age outcomes. The results suggest that the relationship between physical height and schooling, that is well documented in the literature is explained by the effect of height on school readiness rather than height itself. This has important implications for public policy aimed at increasing on-time school enrollment.

For my two other dissertation chapters I examine the relationship between unconditional cash transfers and social support from family, friends and neighbors. By using longitudinal mixed-methods impact evaluations from two large-scale national cash transfer programs in Ghana and Malawi, I explore the (quasi-)experimental designs to assess the impact of the program. In the case of Ghana, the cash transfer program was targeted at pregnant women and mothers with a child below the age of one living in poverty. Using a difference-in-differences approach I find that LEAP 1000 increases overall social support, as well as both emotional and instrumental support when assessed separately. In addition, program beneficiaries are more likely to participate in community groups. In qualitative interviews participants confirmed these findings with descriptions of increased access to financial markets, such as borrowing money or contributing to local savings schemes, and strengthening of social participation in local groups and gatherings. Beneficiary women also highlighted reduced need for economic support and new opportunities to support others. By creating opportunities for additional social support within the household and community, cash transfer crowded-in support, rather than reducing existing sources of support or crowding-out support.

In the last chapter of my dissertation, I use data from a randomized controlled trial evaluation of a cash transfer program targeted at ultra-poor and labor constrained households in Malawi. I analyze whether receiving the cash transfer is affecting caretakers' social support and self-reported stress levels. The motivation builds of the analysis for Ghana and extends it with the idea that cash transfers and social support can both act as buffers to the chronic stress of poverty. The last two chapters differ in context and

type of support. While the cash transfer in Ghana was targeted at mostly young mothers, the cash transfer in Malawi was mainly going to older caregivers fostering grandchildren. In addition, the social support in Malawi focused on a narrower definition of financial social support. With these specifics, I find that the results of difference-in-differences estimates indicate a positive effect of the cash transfer on reducing stress, while having no effect on private financial transfers. Findings from the qualitative analysis suggest that beneficiaries found the cash transfer useful to reduce food insecurity and stress related to the children's basic needs. In addition, beneficiary caregivers indicated that the size of the cash transfer was insufficient to cover the period until the next payment, leading to continued need of private support transfers and no change in transfers given to others. While the cash transfer program in Malawi has a positive effect on reducing stress, it is neither crowding-in or out private social support.

CHAPTER 1 - READY FOR SCHOOL? ON THE RELATIONSHIP BETWEEN EARLY CHILDHOOD DEVELOPMENT AND EARLY SCHOOL ATTENDENCE IN RURAL ZAMBIA

1.1 Introduction

Infant and young children's health status plays an important role in the potential development of children later in life. The literature on the first thousand days of a child's life stresses that adverse shocks in early childhood can have long-term effects on the development of children's sensory-motor, cognitive development and socio-emotional skills (Grantham-McGregor et al., 2007). Subsequently, low levels of development are associated with among others poor schooling (Alderman et al., 2001; Glewwe et al., 2001; Mendez & Adair, 1999), labor market (Gertler et al., 2014) and adult health (Victora et al., 2008) outcomes. In particular in low and middle-income countries children are more likely to not reach their developmental potential due to increased risks factors such as higher stunting rates and early childhood poverty (Grantham-McGregor et al., 2007).

In most of the aforementioned studies, height-for-age is used as a proxy for children's health and developmental status. This is done under the assumption that growth retardation causes developmental delays. However, recent discussions (Alderman, 2019; Leroy & Frongillo, 2019) have questioned this causal inference, and therefore whether stunting is an appropriate measure for skills and development. In this study I combine the assessment of the relationship between prior child nutritional status (height-for-age) and school attendance with a measure of school readiness to assess the role of both variables as proxies to child development. By including readiness, as a measure of children's of age-appropriate skills and display of age-appropriate behavior, it can be assessed what the role of child development is when controlling for height. The estimations give insight into child development outcomes for primary school age children in low-income settings. As a second contribution, most studies focus on school outcomes,

rather than starting age of school attendance. This is an important gap in the literature because on-time school entry is a powerful predictor of eventual school attainment, whereas almost all children in developing countries attend primary school at some point in their life (Unicef, 2012).

The transition into school is one of the major changes in a child's early life, and its timing can have long-term effects. Delayed entry of primary school can affect student learning, and increases the risk of retention and school drop-out rates (Arnold et al., 2007; Chen, 2015; Unicef, 2012). Moreover, following human capital theory early investment in children is preferred when the value of their time is lower than later in life (Doyle et al., 2009). Regardless, delayed entry to primary school is a common phenomenon in sub-Saharan Africa (Bommier & Lambert, 2000; Fentiman et al., 1999; Moyi, 2010; Nonoyama-Tarumi et al., 2010). Empirical research finds various reasons which lead to postponing school attendance, among which are poverty (Engle & Black, 2008), school quality, distance to school (Fentiman et al., 1999), childhood nutrition and health status (Glewwe & Jacoby, 1995). In addition, indicators of school readiness are mentioned as possible reasons. Fentiman et al. (1999) note in a study on school enrollment patterns in Ghana that parents determine school readiness based on the perception of a child's age through physical appearance and the ability to perform age-related tasks. Duncan et al. (2007) describe school readiness as a combination of cognitive, attention and socioemotional skills. These skills are considered important for learning and adaption to the classroom environment.

The extensive literature on the relationship between nutritional status and early childhood development and education has mainly focused on the relationship between stunting and children's ability to perform age-appropriate skills (See Perkins et al. (2017) and Sudfeld et al. (2015) for reviews on child health and cognitive development in low and middle-income countries), but also includes studies showing the positive relationship between height-for-age and fine and gross motor skills (Cheung et al., 2001; Olney et al., 2009), and psychosocial skills (Walker, Chang, et al., 2007). Most cross-sectional studies on the subject find a positive association between children's health and cognitive skills (Bogale et al., 2013; Paxson & Schady, 2007). Several of the longitudinal studies assessed whether this association is lasting over time. Crookston et al. (2011) find larger effects of concurrent stunting on vocabulary tests than from

early stunting. However, other studies observe that the adverse outcomes in cognitive abilities, which are associated with early life anthropometric inputs, remain observable for years (D. S. Berkman et al., 2002; Hamadani et al., 2006). While the association between linear growth and development is recognized in the literature, it is ambiguous whether this relationship is causal. Some studies exploiting exogeneous weather variation match the results from cross-sectional and longitudinal studies in that height-for-age is positively associated with development and school outcomes. Dercon and Porter (2014) and Umana-Aponte (2011) look at the effect of famines on the probability to finish primary school. They both find a negative effect, whereby the latter study finds additional negative results on ever attending school and literacy. Additionally, Leight, Glewwe and Park (2015) find that rainfall shocks when the child is in utero or in the first two years of life have a negative effect on height-for-age and school test scores throughout school age. By early adulthood (17-20 years) these effects are attenuated. They suggest that the decrease of the negative impact of rainfall shocks is due to compensatory behavior of the parents. The change of parental behavior or other interventions seem to highlight disconnections in the relationship between stunting and development. For instance supplement and stimulation interventions in Jamaica show an improvement in cognitive development without changing children's height-for-age (Walker et al., 1996, 2005). Similar findings of improvements in development and a stagnation of stunting were found with other nutrition and childhood development interventions (Aboud et al., 2008; Attanasio et al., 2014; M. M. Black et al., 2017; Martinez et al., 2012). These studies suggest that there is decoupling between stunting and development outcomes, and therefore question the causality.

Few articles focus on height-for-age and early school outcomes simultaneously. Glewwe and Jacoby (1995) analyze the relationship between childhood malnutrition and delay in school enrollment. When instrumenting height-for-age they find that lower height-for-age is associated with a delay in school enrollment. While they consider early rather than longer-term school outcomes, they treat height-for-age as a proxy of school readiness and therefore do not observe the possible discrepancy between the two concepts. In this paper, I separate height-for-age and school readiness, which increases the understanding

of their relative contribution to early school outcomes. I contribute to the debate on value of children's linear growth as a proxy to development. Understanding the association between the two concepts, but also the difference is important in the discussion of policy options in terms of nutrition or childhood stimulation intervention.

This study has three main findings. Firstly, children's height and school readiness are both positively and significantly related to school attendance when measured independently. I observe these findings using linear probability models, and more robust fixed effects and first-difference instrumental variable estimations. Secondly, using the same estimation strategies, I find that when children's height-for-age and school readiness are included simultaneously, school readiness has a positive effect on school attendance, while height is insignificant. This suggests that the predictive power of the holistic school readiness measure is broader than from children's height. For this reason, narrow-focused nutrition interventions are likely to have a more limited effect on school outcomes, than including holistic developmental programs. Lastly, when examining the same cohort three years later, I observe when using an ordered probit with instrumental variables that the positive contribution of school readiness is lasting in children grade-for-age.

The paper is structured as follows, the next section describes the theoretical framework using the human capital production function. Section 3 shortly introduces the Zambian educational system. Section 4 covers the data and identification. Section 5 describes the sample and gives some initial findings, and is followed by the empirical results. The last section comprises of discussion and conclusions.

2. Theoretical Framework

The analysis of school readiness and school attendance builds on the production function of children's human capital. Children's early human capital is a set of cognitive, non-cognitive skills and attention which are required to enter school. For the production function I use a specification grounded in the work of among others Attanasio, and Cunha and Heckman (see for instance Attanasio, 2015; Attanasio et al., 2015; Cunha et al., 2006, 2010), which concentrates on the skill accumulation in the early

developmental stages of life. Human capital θ_i of child i at time t+1 is a function of the stock of the child's health $H_{i,t}$ and school readiness $R_{i,t}$ from the previous period, household investments from the previous period $I_{i,t}$, a vector of household background characteristics comprised in X, child endowment ε_i and random shocks $\eta_{i,t+1}$ in the period of observation.

$$\theta_{i,t+1} = f(H_{i,t}, R_{i,t}, I_{i,t}, X_{i,t}, \varepsilon_i, \eta_{i,t+1}) \quad (1)$$

Within the production function $R_{i,t}$, $I_{i,t}$ and $X_{i,t}$ are multidimensional and can be defined as follows:

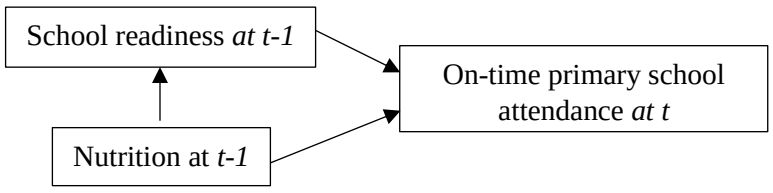
$$R_{i,t} = \{H_{i,t}, C_{i,t}, SE_{i,t}\} \quad (1.a)$$

$$I_{i,t} = \{I_{i,t}^T, I_{i,t}^M\} \quad (1.b)$$

$$X_{i,t} = \{X_{i,t}^m, X_{i,t}^f, X_{i,t}^r\} \quad (1.c)$$

School readiness R_i consists of a combination of cognitive skills C_i, and socio-emotional skills SE_i of the child i at time t. Investments can be divided into time T and material or monetary M investments. The background characteristics X_i may come from the mother m, father f, or other relevant individuals r in the household. Lastly, child endowment, ε_i, in equation 1 consists of unobserved characteristics such as ethnicity, family connections, family environment, and genetically determined components of ability (Becker & Tomes, 1979).

Figure 1-1: **Schematic model of the relationship between nutrition, school readiness and timing of school attendance over time t**



3. Zambia School System

The Zambian educational system exists of 7 years of primary education and 5 years of secondary schooling. Compulsory school age is from 7 until 13 years. The entrance age for primary school is at 7 years and children are expected to finish the lower basic school at age 11 (grade 1-4). Middle basic school

consists of grade 5 to 7 and the expected finishing age is at 13 years. Net enrollment for primary school at the national level is 86.3 percent in 2013. However, the percentage of children enrolled in grade 1 at age 7 is only 50.8 in the same year. The net intake rate of under-age (6 years) and over-age (8 years) in grade 1 is 9.9 percent and 27.8 percent, respectively. This suggests that there is considerable variation in the age of first school attendance (UNESCO UIS, 2019), and that on-time school enrollment is a large problem in the country. Regarding geographic differences, the nationally representative sample of the DHS indicates that 39 percent of children between 5 and 8 years are attending primary school, but in rural areas this proportion decreases even further to 33 percent.

4. Data and Identification

4.1 Data

The data for this study comes from a seven-year panel of households who were surveyed as part of the impact evaluation of the Zambian Child Grant Program (CGP). The CGP was an unconditional cash transfer program established by the Zambian Ministry of Community Development and Social Services targeted at households with a child under three years old in the three districts of Shangombo, Kalabo and Kaputa. The targeting of the program did not include a means-test, but due to the geographical targeting of the three districts which are extremely poor, 90 percent of CGP recipients were below the national extreme poverty line.

The program evaluation was implemented by American Institutes for Research, the University of North Carolina in collaboration with national partner Palm Associates. The baseline data collection took place from October to November 2010. Follow-up surveys were conducted around the same period in the year in 2012 (24-months), 2013[1] (36-months), 2014 (48-months) and 2017 (84-months after the baseline). The assignment to treatment and delayed control groups occurred after the baseline, and the transfer was given for a period of three years. CGP has been gradually ending in the period between 2015 and 2017,

[1] In 2013 there was also a survey 30 months after baseline (in June and July). Due to seasonal differences and to ensure comparability, the 30-month follow-up is not used in this study.

and the program has been replaced by the Harmonized Cash Transfer Program since 2016. The cash transfer had positive effects on among others food security, investment in productive activities, purchase of household goods and necessities for the children, however throughout the evaluation there has not been any significant impact on children's nutrition status and height-for-age in specific (American Institutes for Research., 2016).

Although the data are part of a program evaluation this study will not focus on the effect of the cash transfer. The analysis includes both CGP recipients and control households. The study data are unique in that they follow households with young children during an important developmental stage for a period of seven years. The dataset is rich in child-specific measures such as anthropometrics, early child development and school readiness, and parental and household characteristics, such as maternal education and household expenditure. Due to the study design the sample covers low-income households, who are vulnerable to risks of malnutrition and its consequences to later child development. The sample is a relative homogenous group of households, all located in the rural areas of three of the poorest districts in Zambia.

4.2 Identification

Following the production function, I concentrate on the relationship between children's early health status and school attendance for children between 5 and 8 years to assess the contribution of early-life malnutrition on attending school on-time. The estimation of school attendance S_i of a child at time t is a function of past children's health status measured through height-for-age HAZ_i in the period prior to observing school attendance, background characteristics X_i in period t and time invariant (υ_i) and time varying ($\nu_{i,t}$) unobservables (see equation 2). The equation can be further extended to include school readiness R_i in t-1 as a measure of cognitive and socio-emotional skill components as described in 1.a. Equation 3 enables the analysis of the relationship between school readiness, height-for-age and school attendance.

$$S_{i,t} = \alpha + \beta_1 HAZ_{i,t-1} + X_{i,t}\beta_3 + \upsilon_i + \nu_{i,t} \quad (2)$$

$$S_{i,t} = \alpha + \beta_1 HAZ_{i,t-1} + \beta_2 R_{i,t-1} + X_{i,t}\beta_3 + \upsilon_i + \nu_{i,t} \quad (3)$$

Whereby,

School Attendance (S): Current primary school attendance is measured as a proxy for human capital and the timely entry in primary school. For time t (2014) school attendance is measured for children between 5 and 8 years; the time at which most children start primary school.

Height-for-Age Z-scores (HAZ): Height-for-age is derived from the measurement of height and reported age in months. Z-scores are calculated using WHO international reference population. Height-for-age is lagged by one period to allow it to influence the decision of school attendance at the beginning of the school year.

School Readiness Z-scores (R): Information on cognitive, socio-emotional and physical development as observed by the child's primary caregiver is used to construct a school readiness z-score. The z-score is using the mean and standard deviation from the age-relevant population of 2012 (the earliest wave used in the analysis) to calculate the z-scores for all years to ease the interpretation of changes in school readiness over time (Moeller, 2015). School readiness is lagged with one period such that the school readiness of a child prior to the decision to attend school is taken into account. In 2013, the scale consists of 12 items covering various developmental topics such as counting, ability to concentrate, social abilities and some fine motor-skills and physical abilities (see Table A1 in the Annex for the items by wave). The accumulated score over the twelve items is converted into a z-score to allow for comparability across survey waves.

Background characteristics (X): The vector with background characteristics contains aspects of the child, parents and household, which are directly important for a child's cognitive, non-cognitive and physical skill level. This vector includes age, sex of the child, mother's level of education (i.e. no education, primary education, secondary education or higher), the logarithm of the per capita expenditure, number of children in the household at baseline by age-categories, treatment status in the cash transfer program, logarithm of the distance to the nearest health facility and district. These variables are

considered exogenous to the relationship between child health, school readiness and attendance.

Time-invariant unobservables for individual i (v_i): Unobservables include for instance child endowment and possible measurement error between proxies and their latent variables. These time invariant errors can be addressed by taking the first difference of the estimation equation 2 and 3.

Time-varying unobservables for individual i ($\nu_{i,t}$): The last error term is also unobservable, but varies per period and captures unknown circumstances at period t. Examples of this type of error are for instance exogenous adverse weather circumstances.

The estimation as described above includes time-invariant unobservable variables such as child endowment, general parental preferences and time-use, which can influence school attendance but are not measured. As described by Alderman et al. (2001), there is a correlation possible between height-for-age and the time invariant component of the error term due to underlying parental behavior. Parental behavior can be specific parental knowledge about child development and learning, such as knowledge about healthy nutrition, leading to an overestimation of the effect of height-for-age on school attendance. Correlations may also arise due to omitted variables as parental time-use whereby a parent with less time for feeding and educational play might be more likely to send the child to school early and therefore underestimating the effect between height-for-age or school readiness and school attendance. Lastly, unmeasured child endowment might affect the relationship between height-for-age and school attendance. For instance, if a child falls sick easily due to a weak immune system his or her height-for-age and cognitive development can be negatively affected, which in turn affects school attendance. Simultaneously parents might decide to delay the start of school attendance, such that they can outgrow the illnesses. Not accounting for this type of omitted variable may bias the coefficients of HAZ and R in equations (2) and (3).

Given the availability of multiple waves of data, I follow Todd and Wolpin (2003, 2007) in their specification of the education production function. They describe the individual fixed effects model as a method to remove all time-invariant unobservables from the estimation (see equation 4). The limitations of this approach are that it removes all time-invariant variables, even if they were of interest in the further

analysis. Secondly, the difference of the remaining time varying error term can still be related to any of the lagged variables in the equation. Consider the fixed-effects companion to equation (3) below:

$$\Delta S_{i,t} = \beta_1 \Delta HAZ_{i,t-1} + \beta_2 \Delta R_{i,t-1} + \Delta X_{i,t}\beta_3 + \Delta v_{i,t} \quad (4)$$

In equation (4), the fixed component of the error term (v_i) has been eliminated, but $\Delta v_{i,t}$ can still be related to $\Delta R_{i,t-1}$ and $\Delta HAZ_{i,t-1}$ because they each contain information from period (t-1) as does the error term. The ideal instrument for these equations is time-varying and related to respectively the child's health status and school readiness in the previous period without being related to the decision to attend school in the current period. Following Arellano and Bover (1995) I propose the double lagged height-for-age and double lagged school readiness as an instrument for the respective variables in the difference equation. According to Bhargava (1991) lagged values of these time-varying endogenous variables are valid instruments, because they fulfill the exclusion restriction. That is, the independent variables are related to the decision to attend school, but the instruments in the form of the lagged difference of respectively height-for-age and school readiness are only related to the outcome through the lagged level independent variables. The difference of the time-varying error term ($v_{i,t} - v_{i,t-1}$) will not be correlated with terms obtained from period t-2. This approach to resolving endogeneity has also been used by Federov and Sahn (2005), Rieger and Wagner (2015) and Handa and Peterman (2016). In addition, time-varying exogenous variables such as prices for health inputs, prices of staple foods or weather shocks in the previous period are possible candidates. For this paper I use community level prices, which are interacted with mother's level of education to create more variation at the community level, and community level shocks as additional instruments (see Alderman (2001), Liu, Mroz and Adair (2009) and Handa and Peterman (2016)). See Annex Table A2 for a complete list of all prices and shocks.

In addition to the main model on the relationship between school attendance and child health and development, I explore the relationship between school readiness and childhood nutritional status, since early nutritional status may simply affect early school attendance through its impact on school readiness. School readiness, a comprehensive measure that includes cognitive, non-cognitive and fine motor skills,

is a cumulative process of previous investments in health, care and home stimulation (Duncan et al., 2007; Grantham-McGregor et al., 2007). Understanding the contribution process will help to understand the development of one of the main inputs into children's on-time school attendance and its relationship to child's health. In addition, exploring this relationship might give insight in the role of parental investments and early development of school-relevant skills. The level of school readiness in the current period, $R_{i,t}$, is a function of height-for-age, $HAZ_{i,t-1}$ and household characteristics, $X_{i,t}$, of the same period. Note that height-for-age in t is the stock of all height-for-age, meaning that previous health outcomes are contained in the concurrent term. In addition, child endowment υ_i and an unobservable time-specific error term, $\nu_{i,t}$, will be part of the equation (equation 5).

$$R_{i,t} = \alpha + \beta_1 HAZ_{i,t-1} + X_{i,t}\beta_2 + \upsilon_i + \nu_{i,t} \quad (5)$$

In this estimation I focus on the association between height-for-age and school readiness, given that there are other genetic, biological (e.g. pre-natal growth, infectious diseases, nutrient deficiencies) and psychosocial risk factors (e.g. parental factors, violence) (Britto et al., 2017; Walker, Wachs, et al., 2007), which might be underlying both variables. The relationship is not expected to be free from these endogenous influences and is therefore not interpreted as causal.

5. Sample

Given the eligibility criteria of the CGP all 2,514 households at baseline in 2010 have at least one child below the age of five. An age-cohort from 1 to 4 years at 2010 is selected, such that key variables on height-for-age, school readiness and school attendance are available and the ages are suitable for attending primary school (see Table A3). In the 2014 survey the children in the panel sample are 5 to 8 years old. Given that primary school entrance age is 7 years this is the ideal moment to measure attendance decisions and this survey wave is therefore the main focus of the analysis. While the analysis uses the cross-section of children 5 to 8 years in 2014, the previous waves are used for lagged and differenced variables. The data includes 3,071 children between ages 5 and 8 in 2014, the main wave of

interest, of which 2,579 are present in all waves between 2012 and 2014 (period t-2, t-1 and t), all periods from which data will be used for the main analysis. The final sample of 1,811 individuals is obtained due to a further reduction as a result of limited availability of key variables outcome and input variables. A balanced panel sample is used for the surveys from 2012 until 2014. The final sample (n=1,811) is 59.0 percent of the available data for children aged 5 to 8 in 2014. This reduction includes an attrition rate of 16.0 percent from children not being present in all relevant waves (n=492). The other decline of 25.0 percent is due to the unavailability of key variables (n=768) such as missing height-for-age, school readiness and attendance. Table 1-1 compares some of the key characteristics of the final study sample, with the total attrited sample (n=1,260) in 2014. It shows that there are statistically significant differences between the mean of various variables of the panel study sample and the attrited sample (column 4). The study sample has a statistically lower average age and higher height-for-age than the attrited sample. Moreover, between the study sample and the attrited data there are additional differences regarding mothers' educational level (relatively more mothers with no education in the study sample) and per capita expenditure. Lastly the panel sample has a different distribution from the attrited sample with regards to the study districts (study sample has more households from Shangombo and less from Kaputo). All these statistically significant variables are used as controls in the analysis below.

Table 1-1: Attrition analysis comparing balanced panel with attrited observations

	(1) 2014 Sample Mean	(2) Panel Mean	(3) Attrited Mean	(4) (2)-(3) P-value
Age (in years)	6.33	6.24	6.45	0.00
Female	0.51	0.51	0.50	0.63
Child attending primary school	0.31	0.28	0.36	0.00
Height-for-age z-score t-1	-1.08	-1.02	-1.26	0.00
Stunted in t-1	0.22	0.20	0.27	0.00
School readiness z-score t-1	1.11	1.10	1.11	0.83
Parental investment z-score t-1	-0.16	-0.16	-0.17	0.70
Number of activities between parent and child t-1	1.90	1.89	1.93	0.61
Number of (picture) books in the household t-1	0.14	0.14	0.13	0.47
Child has store-bought toys t-1	0.89	0.88	0.90	0.09

Distance to nearest health facility	53.73	54.99	51.91	0.08
Mother: No education	0.16	0.17	0.15	0.03
Mother: Primary education	0.66	0.65	0.66	0.74
Mother: Secondary or higher	0.18	0.17	0.19	0.09
Empowerment: Woman makes household decisions by herself or jointly	7.02	7.00	7.04	0.53
CGP household	0.49	0.49	0.49	0.95
Total household expenditure per person in the household (2010 ZMW)	50.86	50.95	50.72	0.87
Kaputa	0.37	0.30	0.47	0.00
Kalabo	0.31	0.32	0.28	0.01
Shangombo	0.33	0.38	0.25	0.00
n	3,071	1,811	1,260	

Notes: 2014 sample has been selected based on retention of household across the waves 2012, 2013 and 2014, and availability of key variables on height-for-age (in 2012-2014), school readiness (2012-2014) and primary school attendance (2013, 2014).

As shown in Table 1-2 the sample at the main period of analysis exists of children between 5 and 8 years in 2014, and they are on average 6 years. With regards to their health status, 20 percent of the sample is stunted in 2013 and the average height-for-age is -1.02 standard deviations from the international reference group. The z-score for school readiness is calculated and anchored at the 2012 baseline. In 2013 it shows a 1.10 standard deviation above the baseline. Looking at the outcome of interest 28 percent of the children between 5 and 8 years at time is t are attending school. Of the subsample of 7 and 8 year-olds, who legally should be in school, 59 percent are behind on schooling. Out of the 6 parent-child activities (reading books, story-telling, singing songs, playing, going outside, naming and counting) parents' indicate on average to be only involved in less than a third (1.9). There is a relatively low percentage of children, who have store-bought toys (12 percent) and few children (8 percent) have any (picture) book in the household. The majority of children (83 percent) have a mother who has attained primary school or higher. In addition, in 2014 the average per capita expenditure is 50,946 kwacha (~US$10) per month. The distance to the nearest health facility is 55 kilometers on average, but varies widely. These descriptive statistics suggest that the sample of households are rather poor and live in areas which are largely deprived of easy to access services.

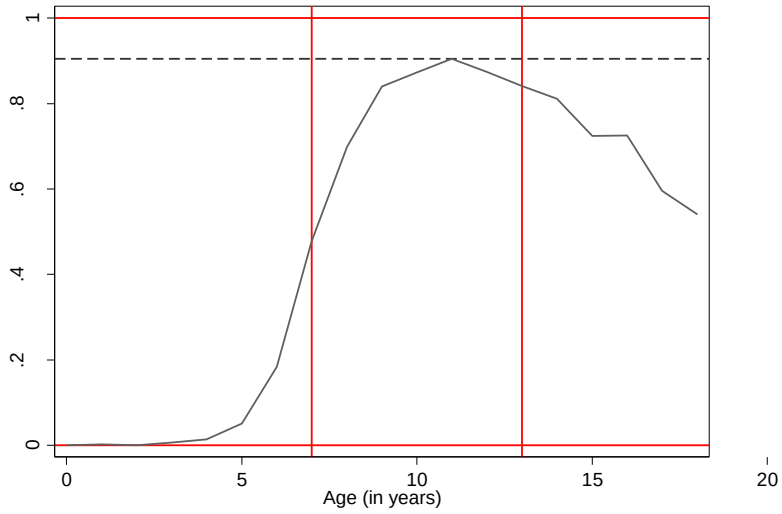
Table 1-2: Child and household characteristics in 2014 at time t

	Mean	Standard deviation	Min	Max
Age (in years)	6.24	1.09	5.0	8.0
Female	0.51	0.50	0.0	1.0
Child attending primary school	0.28	0.45	0.0	1.0
Grade-for-age: Behind in school (7-8 years only; n=695)	0.59	0.49	0.0	1.0
Grade-for-age: Correct grade (7-8 years only; n=695)	0.29	0.46	0.0	1.0
Grade-for-age: Ahead in school (7-8 years only; n=695)	0.12	0.32	0.0	1.0
Height-for-age z-score t-1	-1.02	1.20	-5.7	4.6
Stunted (<-2 std.dev) t-1	0.20	0.40	0.0	1.0
School readiness z-score t-1	1.10	1.07	-2.6	2.8
Number of activities between parent and child t-1	1.89	1.79	0.0	6.0
Any (picture) books in the household t-1	0.08	0.26	0.0	1.0
Child has store-bought toys t-1	0.12	0.33	0.0	1.0
Mother: No education	0.17	0.38	0.0	1.0
Mother: Primary education	0.65	0.48	0.0	1.0
Mother: Secondary or higher	0.17	0.38	0.0	1.0
Distance to nearest health facility (in km)	54.99	48.78	0.2	215.8
CGP household	0.49	0.50	0.0	1.0
Expenditure per capita in 000s (2010 ZMW)	50.95	35.49	3.5	492.1
Kaputa	0.30	0.46	0.0	1.0
Kalabo	0.32	0.47	0.0	1.0
Shangombo	0.38	0.49	0.0	1.0
n	1,811			

Notes: Grade-for-age is only estimated for 7 and 8-year olds, because legal school age is at age 7. While younger children are attending school, they are unable to be behind in school or in the correct grade.

Figure 1-2 shows primary school attendance by age. While the legal primary school age in Zambia is 7 until 13 years, there is a lot of variation around this. Children start primary school as early as 5 years old, but also continue longer than the expected 13 years. At age 7 less than fifty percent (47%) are in school, which reaches about 90 percent at age 11. Afterwards the percentage of children attending by age declines due to early drop-outs. Similar trends are observed across the various waves of the survey.

Figure 1-2: Primary school attendance by age in years in t (2014)



Note: Legal primary school age is 7 to 13 and given between the red vertical lines.

The initial association between lagged height-for-age and school attendance indicate a scattered, but positive pattern suggesting that higher z-scores on height-for-age are associated with higher probabilities of attending (Figure 1-3). A more pronounced and positive associations are visible between the binned averages of the school readiness z-score and height-for-age (at the same period) (Figure 1-4) and lagged school readiness and school attendance in 2014 (Figure 1-5).

Figure 1-3: Association between primary school attendance in 2014 and height-for-age in the previous year (2013)

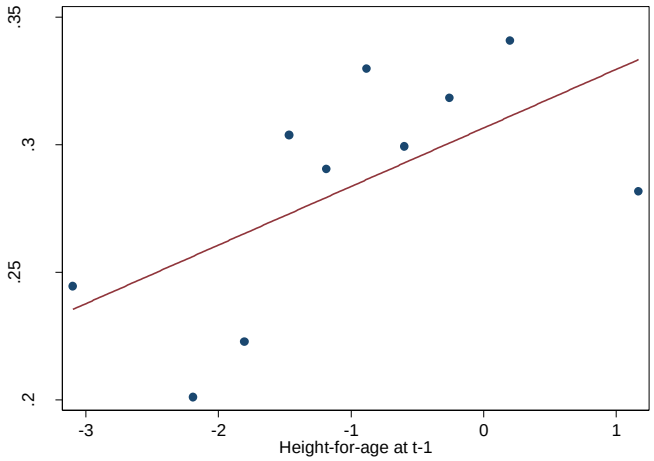


Figure 1-4: Association between school readiness in 2013 and height-for-age in the same year (2013)

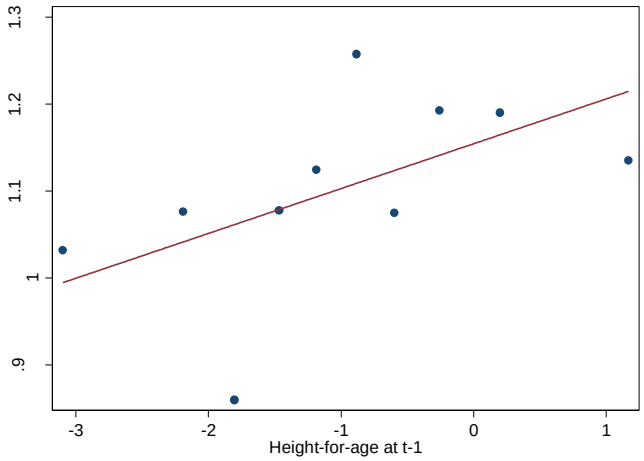
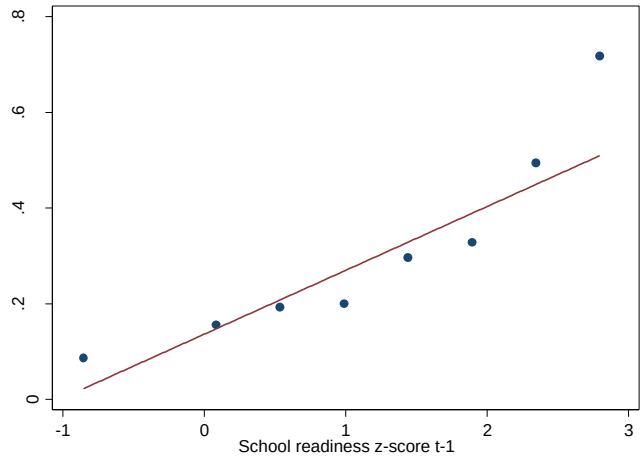


Figure 1-5: Association between primary school attendance in 2014 and school readiness in the previous year (2013)



6. Results

In a linear probability model height-for-age and school readiness are statistically significantly associated with the probability to attend primary school (column 1 and 2 – Table 1-3). When only including basic control variables on age and sex, an additional standard deviation in height-for-age is associated with a 2.9 percentage point higher school attendance rate. For school readiness, each standard deviation is increasing the probability of attending primary school by 4.7 percentage points. In the case that height-for-age and school readiness are added simultaneously, the coefficients remain statistically significant and of nearly the same positive magnitude for both variables (2.6 percentage points compared

to 2.9 percentage points for height-for-age and 4.4 and 4.7 percentage points for school readiness). This minor change suggests that height-for-age does not work through school readiness, but seems to have an independent and direct association with on-time school attendance, though these estimates cannot be interpreted as causal. In column 4, the estimation is fully controlled and the coefficient for height-for-age increases to 3.3 percentage points and school readiness decreases to 3.8 percentage points. These changes are due to variation in mother's educational level, household expenditure and geographical differences.

In addition, I tested the same association using an alternative specification for height-for-age by comparing children's height to the local area mean (Area Coordination Committee level) rather than an internationally comparable reference group. This variable captures relative height differences (with negative values for children who are relatively smaller than their local peers, and positive values for those who are taller), instead of being a more absolute assessment of children's height. The OLS estimation shows that children who are relatively taller in their local community are more likely to attend primary school at the appropriate ages (Table A4).

For children already of legal school age, meaning children either 7 or 8 years old who are attending primary school in 2014, a second schooling outcome is observed, namely their grade-for-age (Table 1-4). An additional standard deviation in height-for-age in 2013 decreases the probability for children being behind in school by 4.5 percentage points, and increases the probability to either be in the correct grade or ahead in school, by 0.8 and 3.7 percentage points respectively. An additional standard deviation in the school readiness scale has an even larger influence, with a 10.4 percentage point decrease on being behind in school, and a 1.9 and 8.5 percentage point increase in the probability of respectively being in the correct grade or ahead.

Table 1-3: OLS estimation between primary school attendance at t (2014) and child school readiness at t-1 (2013) and height-for-age at t-1 (2013)

Dependent variable: Primary school attendance VARIABLES	(1)	(2)	(3)	(4)
Height-for-age t-1	0.029***		0.026***	0.033***
	(0.008)		(0.008)	(0.008)
School readiness z-score t-1		0.047***	0.044***	0.038***
		(0.010)	(0.009)	(0.010)
Age: 6 years old (ref: 5 years)	0.122***	0.107***	0.107***	0.107***
	(0.021)	(0.021)	(0.021)	(0.020)
Age: 7 years old	0.405***	0.367***	0.367***	0.371***
	(0.030)	(0.031)	(0.031)	(0.031)
Age: 8 years old	0.654***	0.594***	0.600***	0.613***
	(0.029)	(0.034)	(0.033)	(0.033)
Female	0.016	0.022	0.017	0.014
	(0.020)	(0.020)	(0.020)	(0.021)
Number of people ages 0 – 5				-0.001
				(0.013)
Number of people ages 6 – 12				-0.001
				(0.009)
Number of people ages 13 – 18				-0.012
				(0.013)
Mother: Primary education (Ref: No education)				0.034
				(0.024)
Mother: Secondary or higher				0.124***
				(0.031)
Log. Of expenditure per capita				0.073***
				(0.019)
CGP household				-0.006
				(0.022)
Log. Of distance to nearest health facility				0.009
				(0.012)
Kalabo (Ref: Kaputa)				-0.085**
				(0.033)
Shangombo				-0.063**
				(0.027)
Constant	0.069***	0.009	0.040**	-0.236***
	(0.018)	(0.015)	(0.018)	(0.082)
Observations	1,811	1,811	1,811	1,807
Adjusted R-squared	0.290	0.294	0.299	0.319

Notes: Community level clustered standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 1-4: Marginal effects on grade-for-age at t (2014) given school readiness and height-for-age at t-1 (2013)

	(1) Grade-for-age	(2) Behind in school	(3) Correct grade	(4) Ahead in school
VARIABLES	Coeff	Marginal effect	Marginal effect	Marginal effect
	(std. error)	(std. error)	(std. error)	(std. error)
Height-for-age t-1	0.175***	-0.045***	0.008**	0.037***
	(0.060)	(0.015)	(0.004)	(0.012)
School readiness z-score t-1	0.406***	-0.104***	0.019***	0.085***
	(0.069)	(0.017)	(0.006)	(0.015)
Age: 8 years old (Ref: 7 years)	-1.449***	0.371***	-0.068***	-0.303***
	(0.149)	(0.036)	(0.024)	(0.023)
Female	-0.082	0.021	-0.004	-0.017
	(0.127)	(0.032)	(0.006)	(0.026)
Number of people ages 0 – 5	-0.291***	0.075***	-0.014***	-0.061***
	(0.089)	(0.022)	(0.005)	(0.020)
Number of people ages 6 – 12	-0.001	0.000	-0.000	-0.000
	(0.052)	(0.013)	(0.002)	(0.011)
Number of people ages 13 – 18	0.143	-0.037	0.007	0.030
	(0.090)	(0.023)	(0.004)	(0.019)
Mother: Primary education (Ref: No education)	0.073	-0.019	0.003	0.015
	(0.186)	(0.048)	(0.009)	(0.039)
Mother: Secondary or higher	-0.023	0.006	-0.001	-0.005
	(0.201)	(0.051)	(0.009)	(0.042)
Log. Of expenditure per capita	0.249**	-0.064**	0.012**	0.052**
	(0.113)	(0.029)	(0.006)	(0.024)
CGP household	0.155	-0.040	0.007	0.032
	(0.138)	(0.035)	(0.007)	(0.028)
Log. Of distance to nearest health facility	0.041	-0.011	0.002	0.009
	(0.075)	(0.019)	(0.004)	(0.016)
Kalabo (Ref: Kaputa)	-0.282*	0.072*	-0.013	-0.059*
	(0.162)	(0.041)	(0.008)	(0.034)
Shangombo	0.141	-0.036	0.007	0.029
	(0.166)	(0.043)	(0.008)	(0.035)
Cut 1	-0.519			
	(0.621)			
Cut 2	1.377**			
	(0.616)			
Observations	394			

Notes: grade-for-age has 3 categories: -1 behind in school, 0 correct grade-for-age, 1 ahead in school. Results are estimated as an ordered probit, and are estimated for 7 and 8-year olds attending school; Community level clustered standard errors in parentheses; ***p<0.01, **p<0.05, *p<0.1

While Tables 1-3 and 1-4 indicate that lower height-for-age may be associated with decreased probability to attend school, the relationship may not be causal for the reasons described earlier. Table 1-5 shows a fixed effects model between 2014 and 2013 (period t and t-1) eliminating the time invariant error. A Hausman test shows that the results between the OLS estimation and the fixed effects model are statistically different ($p<0.00$) and suggests a preference for using fixed effects. Most of the control variables drop out given that they are time invariant also. The relationship between the change in height-for-age between 2013 and 2012 is still positively associated with the change in school attendance between 2013 and 2014 by 1.9 percentage points, but nearly disappears once school readiness is included (column 1 and 3). The relationship between the change in school readiness and primary school attendance is statistically significant and shows a 5.9 percentage point increase (with or without added covariates)[2].

Table 1-5: Fixed effects estimation between primary school attendance at t and t-1 (2014-2013) and school readiness and height-for-age at t-1 and t-2 (2013-2012)

Dependent variable: Primary school attendance VARIABLES	(1)	(2)	(3)	(4)
Height-for-age t-1	0.019*		0.003	0.003
	(0.010)		(0.010)	(0.010)
School readiness z-score t-1		0.059***	0.059***	0.059***
		(0.006)	(0.006)	(0.006)
Log. Of expenditure per capita				-0.002
				(0.018)
Constant	0.231***	0.177***	0.181***	0.189***
	(0.012)	(0.003)	(0.013)	(0.068)
Observations	3,622	3,622	3,622	3,622
Number of unique	1,811	1,811	1,811	1,811
Adjusted R-squared	0.003	0.057	0.057	0.056

Notes: Community level clustered standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Combining the fixed effects and instrumental variable approaches addresses both time invariant endogeneity and possible bias through the overlap between the use of time period t-1 in both the error term and input variables. The instruments used are double lagged input variables, which are included in a differenced equation, in combination with community prices and shocks. The first stage is shown in Table

[2] The variation between t-1 (2013) and t-2 (2012) for height-for-age and school readiness is respectively 0.59 and 0.87 standard deviations of within variation, and 1.06 and 0.78 standard deviations of between variation.

1-6 and indicates that both variables pass the test of weak instrumentation (F(44,89) = 15.37 and 168.7 respectively for height-for-age and school readiness). The coefficients of the instruments in the first stage are negative given that an increase in inputs in t-2 decreases the differenced value between t-1 and t-2, keeping all else constant. The results from the second stage (Table 1-7) are positive and statistically significant between the differenced lagged height-for-age and the differenced school attendance by 8.9 percentage points (column 1). School readiness increases the difference in primary school attendance by 7.9 percentage points. When including both variables in the estimation, the coefficient of height-for-age drops to 2.1 percentage points, a value which is more comparable to the initial OLS estimate. Similar to the fixed effects model, the results are no longer significant at conventional levels. School readiness on the other hand remains statistically significant and has a magnitude which is slightly above the fixed effects model (7.5 percentage points). This second stage passes both the Hansen overidentification test and underidentification test. These results are thus consistent with those from the fixed-effects results and suggest when school readiness is available it might serve as a better proxy to development than physical growth.

Table 1-6: First-stage estimation of instruments for height-for-age t-1 and school readiness t-1 on the differenced equation

VARIABLES	(1) Differenced Height-for-age t-1	(2) Differenced School readiness t-1
Height-for-age t-2	-0.463***	0.070***
	(0.034)	(0.022)
School readiness z-score t-2	-0.015	-0.807***
	(0.024)	(0.028)
Differenced log. Of expenditure per capita	0.029	-0.057
	(0.043)	(0.051)
Prices*mother's education t-2	Yes	Yes
Shocks t-2	Yes	Yes
Observations	1,811	1,811
Adjusted R-squared	0.287	0.637
Shea's adjusted partial R-squared	0.249	0.551
F-statistic	15.37	168.7

Notes: Community level clustered standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 1-7: FD-IV estimation on primary school attendance at t and t-1 (2014-2013), and instrumented difference in height-for-age and school readiness at t-1 and t-2 (2013-2012)

Dependent variable: Differenced Primary school attendance VARIABLES	(1)	(2)	(3)	(4)
Differenced Height-for-age t-1	0.089***		0.021	0.021
	(0.018)		(0.021)	(0.021)
Differenced School readiness z-score t-1		0.079***	0.075***	0.075***
		(0.006)	(0.008)	(0.008)
Differenced Log. of expenditure per capita				0.002
				(0.018)
Observations	1,811	1,811	1,811	1,811
Underidentification	0.001	0.000	0.003	0.003
Hansen J statistic for overidentification	0.011	0.098	0.111	0.111

Notes: double lagged height-for-age, double lagged school readiness and community prices interacted with mother's education and shocks are used as instruments; Community level clustered standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Even though the CGP has shown to not have any significant effect on height-for-age or the school readiness variables (American Institutes for Research., 2016), I estimated the OLS regression and fixed effects instrumental variable model with the control group (see Annex Table A5, A6 and A7). The results confirm similar trends and magnitudes. Due to the small sample size and smaller clusters the fixed effects instrumental variable model does not pass the underidentification test, and should therefore be interpreted with caution.

6.1 Relationship between school readiness and previous investments of health

School readiness is one of the main inputs in the timely school attendance of children. The relationship once height-for-age is included and any potential endogeneity is removed from the estimation remains positive and statistically significant (see Table 1-7). Noteworthy is that height-for-age loses its significance when school readiness is added. To further understand the interaction between height-for-age and school readiness I show the OLS estimate of the association of lagged height for age and school readiness (Table 1-8). Height-for-age of the previous period is positively associated with an increase in the school readiness z-score both when applying basic control variables as in a fully controlled

specification (respectively 6.1 percentage points at p<0.01, and 4.1 percentage points, p<0.5). This association confirms the intuitive relationship suggested by Table 7, that school readiness is the channel through which height-for-age influences school entry.

Table 1-8: OLS estimation between school readiness at t (2014) and height-for-age at t-1 (2013)

Dependent variable: School readiness z-score in t VARIABLES	(1)	(2)
Height-for-age t-1	0.064***	0.041**
	(0.023)	(0.019)
Age: 6 years old (ref: 5 years)	0.423***	0.431***
	(0.077)	(0.072)
Age: 7 years old	0.938***	0.947***
	(0.076)	(0.077)
Age: 8 years old	1.281***	1.320***
	(0.068)	(0.071)
Female	-0.028	-0.017
	(0.044)	(0.044)
Number of people ages 0 - 5		0.028
		(0.037)
Number of people ages 6 - 12		0.029
		(0.026)
Number of people ages 13 - 18		-0.010
		(0.037)
Mother: Primary education (Ref: No education)		0.003
		(0.072)
Mother: Secondary or higher		0.132
		(0.081)
Log. of expenditure per capita		0.300***
		(0.082)
CGP household		-0.089
		(0.097)
Log. of distance to nearest health facility		0.204***
		(0.041)
Kalabo (Ref: Kaputa)		-0.249*
		(0.146)
Shangombo		0.412***
		(0.099)
Constant	0.739***	-1.279***
	(0.073)	(0.369)
Observations	1,811	1,807
Adjusted R-squared	0.175	0.232

Notes: Community level clustered standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

6.2 Longer-term effects: School attendance and grade-for-age in 2017

Given the availability of data for school attendance and grade-for-age in 2017, it is possible to extend the analysis to estimate the effects on these schooling variables for the same cohort three years later. The children of the study sample were between 8 and 11 years old in 2017, and all of them were therefore within the range of compulsory school age (being 7-13 years). In 2017, 77.1 percent of the children aged 8 to 11 were in primary school. Of the children not in school some will never attend, for instance of the sample between age 14 and 24 years only 20.0 percent are not in primary school nor have finished primary school. In other words, it is expected that height-for-age and school readiness would not affect attendance in 2017. Estimating the effects of height-for-age and school readiness on school attendance can therefore serve as a control test.

For the children in school, there is however the opportunity to examine whether there are any lasting effects of height-for-age and school readiness by examining their grade relative to the children's age. Grade-for-age can serve as an indication of whether delayed school entry has longer term effects if children keep attending school at a delayed pace in comparison to their peers.

The OLS regression between height-for-age, school readiness and school attendance shows as expected only a weakly significant increase in attendance by a higher height-for-age (1.5 percentage points when fully controlled), while school readiness is insignificant with and without control variables (Table 1-9). When applying a fixed effects model to purge the estimation of time varying bias, the fully controlled relationship between height-for-age and school attendance turns negative and is weakly significant ($p<0.1$) (Table 1-10). The negative relationship might be due to the limited variation in school attendance.

Table 1-9: OLS estimation between primary school attendance at t+1 (2017) and child school readiness and height-for-age at t (2014)

Dependent variable: Primary school attendance t+1 VARIABLES	(1)	(2)	(3)	(4)
Height-for-age t	0.013		0.012	0.015*
	(0.008)		(0.008)	(0.008)
School readiness z-score t		0.017	0.017	0.013
		(0.012)	(0.012)	(0.011)
Age: 9 years old (ref: 8 years)	0.172***	0.164***	0.164***	0.170***
	(0.028)	(0.028)	(0.028)	(0.027)
Age: 10 years old	0.235***	0.218***	0.219***	0.235***
	(0.030)	(0.032)	(0.032)	(0.032)
Age: 11 years old	0.233***	0.209***	0.211***	0.234***
	(0.030)	(0.032)	(0.032)	(0.031)
Female	0.021	0.023	0.020	0.015
	(0.022)	(0.022)	(0.022)	(0.023)
Number of people ages 0 - 5				-0.035**
				(0.015)
Number of people ages 6 - 12				-0.031***
				(0.011)
Number of people ages 13 - 18				0.024*
				(0.012)
Mother: Primary education (Ref: No education)				0.042
				(0.032)
Mother: Secondary or higher				0.072*
				(0.040)
Log. of expenditure per capita				0.094***
				(0.018)
CGP household				0.001
				(0.032)
Log. of distance to nearest health facility				0.032**
				(0.014)
Kalabo (Ref: Kaputa)				-0.098**
				(0.044)
Shangombo				-0.112***
				(0.036)
Constant	0.629***	0.604***	0.619***	0.286***
	(0.033)	(0.034)	(0.034)	(0.096)
Observations	1,509	1,509	1,509	1,509
Adjusted R-squared	0.053	0.053	0.054	0.116

Notes: Community level clustered standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table 1-10: Fixed effects model on primary school attendance at t+1 and t (2017-2014), height-for-age and school readiness at t and t-1 (2014-2013)

Dependent variable: Primary school attendance t+1 VARIABLES	(1)	(2)	(3)	(4)
Height-for-age t	-0.041		-0.041	-0.046*
	(0.028)		(0.028)	(0.028)
School readiness z-score t		0.003	0.002	0.005
		(0.016)	(0.016)	(0.015)
Log. of expenditure per capita t+1				0.083**
				(0.038)
Constant	0.461***	0.502***	0.459***	0.136
	(0.030)	(0.018)	(0.034)	(0.145)
Observations	3,320	3,320	3,320	3,320
Number of unique	1,811	1,811	1,811	1,811
Adjusted R-squared	0.002	-0.000	0.002	0.009

Notes; Community level clustered standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

The second outcome on grade-for-age is estimated as an ordered probit and the marginal effects indicate that there is a positive relationship between height-for-age and grade-for-age, as well as for school readiness and grade-for-age (Table 1-11). An additional standard deviation of height-for-age in the previous period decreases the probability of being behind in school by 3.9 percentage points, and increases the probability of being in the correct grade (2.1 percentage points) or being ahead (1.8 percentage points). A higher school readiness is also related to a decrease in the probability of being behind (6.8 percentage points), and strengthens the probability of being in the right grade or ahead (3.7 and 3.1 percentage points respectively).

Table 1-11: Marginal effects on grade-for-age at t+1 (2017) given school readiness and height-for-age at t (2014)

	(1) Grade-for-age	(2) Behind in school	(3) Correct grade	(4) Ahead in school
VARIABLES	Coeff	Marginal effect	Marginal effect	Marginal effect
	(std. error)	(std. error)	(std. error)	(std. error)
Height-for-age t	0.120***	-0.039***	0.021***	0.018***
	(0.028)	(0.009)	(0.005)	(0.004)
School readiness z-score t	0.208***	-0.068***	0.037***	0.031***
	(0.045)	(0.014)	(0.007)	(0.007)
Age: 9 years old (Ref: 8 years)	-0.390***	0.128***	-0.069***	-0.059***
	(0.103)	(0.033)	(0.019)	(0.015)
Age: 10 years old	-0.818***	0.268***	-0.145***	-0.123***
	(0.115)	(0.035)	(0.019)	(0.020)
Age: 11 years old	-1.149***	0.377***	-0.204***	-0.172***
	(0.152)	(0.044)	(0.025)	(0.026)
Female	0.132*	-0.043*	0.024*	0.020*
	(0.077)	(0.025)	(0.014)	(0.012)
Number of people ages 0 - 5	0.007	-0.002	0.001	0.001
	(0.057)	(0.019)	(0.010)	(0.009)
Number of people ages 6 - 12	0.017	-0.006	0.003	0.003
	(0.041)	(0.013)	(0.007)	(0.006)
Number of people ages 13 - 18	-0.013	0.004	-0.002	-0.002
	(0.053)	(0.017)	(0.009)	(0.008)
Mother: Primary education (Ref: No education)	0.115	-0.038	0.021	0.017
	(0.138)	(0.045)	(0.024)	(0.021)
Mother: Secondary or higher	0.251*	-0.082*	0.045*	0.038*
	(0.133)	(0.044)	(0.024)	(0.020)
Log. of expenditure per capita	0.233***	-0.077***	0.041***	0.035***
	(0.068)	(0.022)	(0.011)	(0.011)
CGP household	0.039	-0.013	0.007	0.006
	(0.104)	(0.034)	(0.018)	(0.016)
Log. of distance to nearest health facility	-0.006	0.002	-0.001	-0.001
	(0.043)	(0.014)	(0.008)	(0.006)
Kalabo (Ref: Kaputa)	-0.167	0.055	-0.030	-0.025
	(0.153)	(0.050)	(0.027)	(0.023)
Shangombo	-0.276**	0.090**	-0.049**	-0.041**
	(0.119)	(0.039)	(0.021)	(0.019)
Cut 1	1.017***			
	(0.384)			
Cut 2	2.012***			
	(0.369)			
Observations	1,157			

Notes: grade-for-age has 3 categories: -1 behind in school, 0 correct grade-for-age, 1 ahead in school. Results are estimated as an ordered probit, and are estimated for 8 to 11-year olds; Community level clustered standard errors in parentheses; ***p<0.01, **p<0.05, *p<0.1

While the ordered probit estimation suffers from the same possible endogeneity as the relationship between school attendance and height-for-age and readiness, I apply instrumental variables to correct for possible bias. The instruments are the lagged differences of height-for-age and school readiness, as well as the full set of interacted community prices and shocks. The first-stage of the instrumental variable approach indicates that the lagged height-for-age estimation just passes the test of strength with an F-statistic of 10.5 (Annex Table A8). The prediction of school readiness is stronger with F(44,89)=35.5.The findings of the instrumented ordered probit are insignificant for height-for-age, and given somewhat weak instrumentation they should be approached with caution. School readiness in year 2014 is significant at the 10 percent level and has the expected sign. The level of school readiness has a positive influence on children being in the correct grade (2.2 percentage points) and being ahead in school (1.8 percentage points), while reducing the probability of being behind in school (4.0 percentage points). The insignificant results of school attendance and slightly positive effects on grade-for-age after three years of the initial observation are consistent with delayed school attendance having some lasting effect on later school outcomes.

Table 1-12: Marginal effects on grade-for-age at t+1 (2017) given instrumented school readiness and instrumented height-for-age at t (2014)

	(1) Grade-for-age	(2) Behind in school	(3) Correct grade	(4) Ahead in school
VARIABLES	Coeff	Marginal effect	Marginal effect	Marginal effect
	(std. error)	(std. error)	(std. error)	(std. error)
Height-for-age t	-0.020	0.007	-0.004	-0.003
	(0.060)	(0.020)	(0.011)	(0.009)
School readiness z-score t	0.118*	-0.040*	0.022*	0.018*
	(0.066)	(0.022)	(0.012)	(0.010)
Age: 9 years old (Ref: 8 years)	-0.336***	0.113***	-0.062***	-0.052***
	(0.103)	(0.033)	(0.019)	(0.015)
Age: 10 years old	-0.708***	0.238***	-0.130***	-0.108***
	(0.126)	(0.039)	(0.023)	(0.020)
Age: 11 years old	-1.025***	0.344***	-0.188***	-0.156***
	(0.167)	(0.051)	(0.030)	(0.026)

Female	0.147**	-0.049**	0.027**	0.022*
	(0.074)	(0.025)	(0.013)	(0.012)
Number of people ages 0 - 5	-0.011	0.004	-0.002	-0.002
	(0.056)	(0.019)	(0.010)	(0.009)
Number of people ages 6 - 12	0.029	-0.010	0.005	0.004
	(0.041)	(0.014)	(0.008)	(0.006)
Number of people ages 13 - 18	-0.015	0.005	-0.003	-0.002
	(0.053)	(0.018)	(0.010)	(0.008)
Mother: Primary education (Ref: No education)	0.112	-0.038	0.021	0.017
	(0.138)	(0.046)	(0.025)	(0.021)
Mother: Secondary or higher	0.281**	-0.094**	0.051**	0.043**
	(0.130)	(0.044)	(0.024)	(0.021)
Log. of expenditure per capita	0.231***	-0.078***	0.042***	0.035***
	(0.069)	(0.022)	(0.012)	(0.011)
CGP household	0.051	-0.017	0.009	0.008
	(0.101)	(0.034)	(0.018)	(0.015)
Log. of distance to nearest health facility	0.016	-0.005	0.003	0.002
	(0.044)	(0.015)	(0.008)	(0.007)
Kalabo (Ref: Kaputa)	-0.108	0.036	-0.020	-0.016
	(0.156)	(0.052)	(0.028)	(0.024)
Shangombo	-0.128	0.043	-0.023	-0.020
	(0.129)	(0.043)	(0.024)	(0.020)
Cut 1	1.248***			
	(0.399)			
Cut 2	2.221***			
	(0.382)			
Observations	1,157			

Notes: grade-for-age has 3 categories: -1 behind in school, 0 correct grade-for-age, 1 ahead in school. Results are estimated as an ordered probit, and are estimated for 8 to 11-year olds; Community level clustered standard errors in parentheses; ***p<0.01, **p<0.05, *p<0.1

7. Discussion and Conclusions

This study explores the relationship between child malnutrition, readiness and early primary school attendance, and contributes to the literature in two ways. First, this paper adds to the limited studies focusing on the beginning of schooling rather than on school outcomes, such as achievement and completion, which are often only observed for children who have been in school for some time. The findings echo results from Glewwe and Jacoby (1995) that lower height-for-age leads to delay in school attendance. Secondly, this study includes both height-for-age as a proxy of health and physical development, and school readiness, measured as cognitive, socio-emotional and physical abilities. I find that both height-for-age and school readiness have positive effects on school attendance when estimated

separately. When controlling for linear growth, school readiness also has an independent effect on school attendance indicating As shown in most of the existing literature (Glewwe & King, 2001; Umana-Aponte, 2011) I confirm a positive relationship between child health status, as measured through height-for-age and school attendance with an initial biased OLS estimation. School readiness is also positively associated with the probability of attending primary school among 5 to 8 years olds in this estimation. When using a fixed effects model to address time invariant endogeneity, height-for-age contributes to an increased probability of attending school with 1.9 percentage points for every standard deviation increase in height-for-age, significant at the 10 percent level. However, I find that once school readiness is added in this model the significance of height-for-age disappears and only school readiness makes a positive and significant contribution of about 6 percentage points. The same trend of significant school readiness and insignificant height-for-age persists in the first-difference instrumental variable model, which purges the estimates of bias due to both time invariant and time varying endogeneity. The coefficient of school readiness increases to 7.6 percentage points.

The results in this paper focus mainly on the outcomes for children between 5 and 8 years old, given that they are at a crucial age in which they transition to start attending school. I extended the analysis by examining school attendance and grade-for-age for the same cohort of children three years later when they are 8 to 11 years old. The results are in line with the expectation; that school attendance at the ages when the main decision on transition to school have already been made is unaffected by variation in height-for-age and school readiness. With regards to grade-for-age, the findings display a pattern consistent with outcomes based on school attendance in 2014, namely that school readiness positively contributes to not being delayed in school.

While the results of this study are contributing to the knowledge on child development, it should be noted that the data for this paper is not representative of the whole country. The dataset covers households which are eligible for the cash transfer program, meaning that they are all extreme poor and vulnerable households living in rural areas. In this dataset only 28 percent of children between 5 and 8 years are attending primary school. As a comparison the national representative sample of the DHS

indicates that 39 percent of children of the same age are attending primary school, in rural areas this proportion decreases to 33 percent (Central Statistical Office (CSO) [Zambia] et al., 2014). What is telling is the strong relationship between childhood nutrition, school readiness, and school attendance even in this sample of poor households where variations in these key variables are lower.

Understanding the appropriateness of children's linear growth and school readiness as proxies of child development for children of primary school age has implications for policy and practice. If children's health status as measured through height-for-age is an exact proxy than policy focusing on nutrition interventions should be prioritized. If school readiness defined as the ability to perform a certain set of skills, is a proxy than parental interaction or stimulation should be preferred. The findings of this study suggest that nutrition interventions are necessary, but might not be sufficient to achieve children's full developmental potential. Additional programs concentrating on stimulation and building up of cognitive, non-cognitive and socio-emotional skills are required given that school readiness is predicting early school attendance independently of height-for-age.

ANNEX

Table A1: School readiness items used for z-score scale

2012 (3 – 6 years)	2013 (4 – 7 years)	2014 (5 – 8 years)	2017 (8 – 11 years)
Identify/name letters of the alphabet	Pay attention well	Pay attention well	Pay attention well
Read four simple, popular words	Sit still for at least 5 minutes	Sit still for at least 5 minutes	Sit still for at least 5 minutes
Recognize numbers 1 to 10	Identify shapes and colors	Identify shapes and colors	Identify shapes and colors
Pick up small object with two fingers	Count to 20 or higher	Count to 20 or higher	Count to 20 or higher
Is sometimes too sick to play (no=1)	Uses words to describe feelings such as excited, sad, happy	Uses words to describe feelings such as excited, sad, happy	Uses words to describe feelings such as excited, sad, happy
Follow simple directions	Invites other children to play	Invites other children to play	Can draw a circle
Able to do things independently	Has frequent conflicts with other children	Has frequent conflicts with other children	Can stack objects on top of another
Gets along with other children	Is angry frequently	Is angry frequently	Can read words in any language
Kicks, bites or hit other children or adults (no=1)	Can draw a circle	Can draw a circle	Can do simple math such as '5+5' and '6-4'
Gets distracted easily (no=1)	Can stack objects on top of another	Can stack objects on top of another	Can write simple words in any language
	Can kick a ball	Can kick a ball	
	Can jump on one foot	Can jump on one foot	

Table A2: List of instruments based on community prices and negative shocks

Prices	Negative shocks in last 2 years
Maize grain	Loss social services
Rice	Massive job lay-offs
Beans	Sharp price change
Fish	Human disease/epidemic
Chicken	Livestock disease
Oil	Crop disease
Sugar	Floods
Table soap	Drought
Laundry soap	
Panadol	
Salt	

Note: Prices have been interacted with mother's level of education, being (1) no education, (2) primary education or (3) secondary education or higher.

Table A3: Ages of panel by period and availability of variables

Survey year	**2010** **t-3**	**2012** **t-2**	**2013** **t-1**	**2014** **t**	**2017** **t+1**
Ages	1-4 years	3-6 years	4-7 years	5-8 years	8-11 years
Availability of variables					
Height-for-age	Yes	Yes	Yes	Yes	No
School readiness	No	Yes	Yes	Yes	Partially
School attendance	No	Yes	Yes	Yes	Yes

Table A4: OLS estimation between primary school attendance at t (2014) and school readiness and height-for-age (distance to local median) at t-1 (2013)

Dependent variable: Primary school attendance VARIABLES	(1)	(2)	(3)	(4)
Height-for-age t-1 (distance to local median)	0.036***		0.033***	0.033***
	(0.008)		(0.008)	(0.008)
School readiness z-score t-1		0.047***	0.043***	0.038***
		(0.010)	(0.009)	(0.010)
Age: 6 years old (ref: 5 years)	0.126***	0.107***	0.111***	0.111***
	(0.021)	(0.021)	(0.021)	(0.020)
Age: 7 years old	0.409***	0.367***	0.371***	0.377***
	(0.030)	(0.031)	(0.031)	(0.031)
Age: 8 years old	0.655***	0.594***	0.602***	0.615***
	(0.029)	(0.034)	(0.034)	(0.033)
Female	0.015	0.022	0.016	0.015
	(0.020)	(0.020)	(0.020)	(0.021)
Number of people ages 0 - 5				-0.002
				(0.014)
Number of people ages 6 - 12				-0.001
				(0.009)
Number of people ages 13 - 18				-0.012
				(0.013)
Mother: Primary education (Ref: No education)				0.034
				(0.024)
Mother: Secondary or higher				0.124***
				(0.031)
Log. of expenditure per capita				0.074***
				(0.019)
CGP household				-0.005
				(0.022)
Log. of distance to nearest health facility				0.009
				(0.012)
Kalabo (Ref: Kaputa)				-0.065*
				(0.034)
Shangombo				-0.037
				(0.027)
Constant	0.032**	0.009	0.006	-0.294***
	(0.015)	(0.015)	(0.015)	(0.081)
Observations	1,811	1,811	1,811	1,807
Adjusted R-squared	0.292	0.294	0.301	0.319

Note: Community level clustered standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table A5: OLS estimation between primary school attendance at t (2014) and child school readiness at t-1 (2013) and height-for-age at t-1 (2013) for non-CGP households

Dependent variable: Primary school attendance VARIABLES	(1)	(2)	(3)	(4)
Height-for-age t-1	0.041***		0.039***	0.039***
	(0.012)		(0.012)	(0.012)
School readiness z-score t-1		0.050***	0.047***	0.045***
		(0.015)	(0.015)	(0.015)
Age: 6 years old (ref: 5 years)	0.117***	0.104***	0.102***	0.091**
	(0.034)	(0.036)	(0.035)	(0.035)
Age: 7 years old	0.368***	0.323***	0.325***	0.329***
	(0.042)	(0.043)	(0.043)	(0.042)
Age: 8 years old	0.626***	0.557***	0.567***	0.568***
	(0.042)	(0.050)	(0.049)	(0.050)
Female	0.006	0.016	0.009	0.013
	(0.030)	(0.030)	(0.030)	(0.030)
Number of people ages 0 – 5				0.010
				(0.023)
Number of people ages 6 – 12				0.004
				(0.013)
Number of people ages 13 – 18				-0.019
				(0.019)
Mother: Primary education (Ref: No education)				0.066*
				(0.033)
Mother: Secondary or higher				0.153***
				(0.044)
Log. Of expenditure per capita				-0.001
				(0.014)
Log. Of distance to nearest health facility				0.023
				(0.046)
Kalabo (Ref: Kaputa)				0.001
				(0.039)
Shangombo				0.075***
				(0.027)
Constant	0.091***	0.017	0.061**	-0.296**
	(0.026)	(0.023)	(0.026)	(0.131)
Observations	915	915	915	913
Adjusted R-squared	0.257	0.256	0.267	0.284

Notes: Community level clustered standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table A6: First-stage estimation of instruments for height-for-age t-1 and school readiness t-1 on the differenced equation for non-CGP households

VARIABLES	(1) Differenced Height-for-age t-1	(2) Differenced School readiness t-1
Height-for-age t-2	-0.493***	0.041
	(0.052)	(0.032)
School readiness z-score t-2	-0.027	-0.823***
	(0.035)	(0.043)
Differenced log. Of expenditure per capita	0.072	-0.125*
	(0.066)	(0.071)
Prices*mother's education t-2	Yes	Yes
Shocks t-2	Yes	Yes
Observations	915	915
Adjusted R-squared	0.308	0.649
Shea's adjusted partial R-squared	0.260	0.552
F-statistic	3158	2794

Notes: Community level clustered standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table A7: FD-IV estimation on primary school attendance at t and t-1 (2014-2013), and instrumented difference in height-for-age and school readiness at t-1 and t-2 (2013-2012) for non-CGP households

Dependent variable: Differenced Primary school attendance VARIABLES	(1)	(2)	(3)	(4)
Differenced Height-for-age t-1	0.087***		0.022	0.023
	(0.022)		(0.025)	(0.025)
Differenced School readiness z-score t-1		0.083***	0.078***	0.078***
		(0.009)	(0.012)	(0.013)
Differenced Log. of expenditure per capita				0.002
				(0.023)
Observations	915	915	915	915
Underidentification	0.390	0.404	0.393	0.387
Hansen J statistic for overidentification	0.455	0.435	0.455	0.471

Notes: double lagged height-for-age, double lagged school readiness and community prices interacted with mother's education and shocks are used as instruments; Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table A8: First-stage estimation of instruments for lagged height-for-age and lagged school readiness (2013) for grade-for-age IV-ordered probit

VARIABLES	(1) Height-for-age t-1	(2) School readiness t-1
Differenced Height-for-age t-t-1	0.696***	-0.017
	(0.056)	(0.027)
Differenced School readiness t-t-1	-0.062***	0.523***
	(0.023)	(0.021)
Age: 9 years old (Ref: 8 years)	0.072	0.439***
	(0.091)	(0.065)
Age: 10 years old	0.079	0.928***
	(0.102)	(0.081)
Age: 11 years old	-0.148	1.304***
	(0.102)	(0.067)
Female	0.179***	0.042
	(0.058)	(0.048)
Number of people ages 0 - 5	-0.043	-0.039
	(0.051)	(0.037)
Number of people ages 6 - 12	0.035	-0.024
	(0.031)	(0.025)
Number of people ages 13 - 18	0.015	0.016
	(0.041)	(0.025)
Mother: Primary education (Ref: No education)	0.127	-0.066
	(0.117)	(0.087)
Mother: Secondary or higher	0.152	-0.004
	(0.161)	(0.106)
Log. of expenditure per capita	0.043	0.015
	(0.059)	(0.047)
CGP household	0.088	-0.070
	(0.085)	(0.080)
Log. of distance to nearest health facility	-0.033	0.071*
	(0.040)	(0.038)
Kalabo (Ref: Kaputa)	0.646***	-0.042
	(0.156)	(0.145)
Shangombo	0.579***	0.446***
	(0.128)	(0.128)
Differenced Prices*mother's education t-1	Yes	Yes
Differenced shocks t-1	Yes	Yes
Constant	-1.790***	0.356
	(0.354)	(0.277)
Observations	1,157	1,157
R-squared	0.301	0.605
F-statistic	10.54	35.46

Notes: Community level clustered standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

CHAPTER 2 - CROWDING-OUT OR CROWDING-IN? EFFECTS OF LEAP 1000 UNCONDITIONAL CASH TRANSFER PROGRAM ON HOUSEHOLD AND COMMUNITY SUPPORT AMONG WOMEN IN RURAL GHANA

1. Introduction

Like many integrated social protection programs, LEAP 1000 is designed to decrease poverty and improve the resilience of vulnerable households (Ghana LEAP 1000 Evaluation Team, 2016). More specifically, the program focuses on the well-being of households with pregnant women and children below the age of one in order to reach children at early stages in their development. The program creates a reliable source of complementary income, alongside income from agricultural and non-agricultural livelihood activities, inter-person transfers (e.g. remittances, loans, gifts) and possibly other social protection programs. Earlier research on poor populations in rural Ghana showed that most households have an existing social network, who can help them in times of adverse events or to make ends meet on a regular basis. The majority of this social support came from family, friends, and relatives, who live inside the community. Social support networks beyond the community were considered weak and unreliable (Oxford Policy Management, 2013).

The dynamics of these social support networks and the support they provide may be affected when the government starts providing financial support. One theory (Barro, 1974; Becker, 1974) suggests that the formal organization of financial support by the government replaces or "crowds-out" the informal support of friends, neighbors and acquaintances. This negative effect of a government intervention on social support may dampen the program's positive effects on individual and household wellbeing. However, cash transfers programs can also strengthen participants' social support networks by enabling them to be more cooperative towards community members, spend more time with people in their existing networks, provide more support to network members, and engage in new activities (Attanasio et al., 2009;

Pavanello et al., 2016; Rock et al., 2016). The broadening of social support due government support is called a crowding-in effect. For cash transfers it is hypothesized to reinforce the expected program effect. The current literature is ambiguous on whether there is a crowding-out or crowding-in effect of cash transfer programs (Albarran & Attanasio, 2003; Angelucci et al. 2012). A limitation to the current literature is that few studies assess non-financial forms of support, such as instrumental or emotional support (Künemund & Rein, 1999). Lastly, to our knowledge no studies have used a mixed methods approach to both quantify change in social support as well as explore women's experiences with regards to the change in support due to receiving the cash transfer.

In this study, I use a mixed-methods approach to assess the changes that occur in social support dynamics between beneficiaries and their personal and community networks as a result of the introduction of an unconditional cash transfer program. I seek to understand whether the changes indicate an overall crowding-out or crowding-in effect of social support. Moreover, I explore what kind of support is exchanged and the strength of the relationship between the participant and the support giver.

Overall, the findings show that LEAP 1000 does not decrease the access to social support, therefore refuting the crowding-out hypothesis. The increased group membership and participation in local ceremonies and activities suggests a potential crowding-in of new social support.

In the following section I present the theoretical framework of the study in which I draw upon sociological theories of social networks and support and economic theory of crowding out. Section 3 includes a description of the LEAP 1000 program. Section 4 covers the study design, sample and methods for the quantitative and qualitative analysis. Section 5 comprises the key results, followed by a discussion and concluding remarks.

2. Theoretical framework

Underlying this study is the sociological understanding of social support and the economic theory on crowding-out. Wills and Ainette (2012) broadly define social support as 'the extent of a person's social integration in the community (i.e., social network) and the resources provided by others that may

be useful for helping to cope with problems (i.e., supportive functions).' The measurement of social support occurs often along the dimensions of functional and structural support. Examples of functional social support are informational, emotional, and instrumental support (Taylor, 2007; Wellman & Wortley, 1990). In order to cope with a particular shock, different kinds of support might be needed. Structural social support focuses on the number of relationships and the interconnectedness among the members in the support network. Changes in social support can therefore occur by network members providing different types of support or by changing the number or type of relationships. Granovetter's 'Strength of Weak Ties' (1973) sets out the importance of having both close friends and family (strong ties) and acquaintances (weak ties) within a social network to promote social organization. Weak ties, in particular have the potential to form bridges between different networks and generate new sources of support. Following this theory, there will be a specific role for acquaintances and community members in creating new access points to social support (Pavanello et al., 2016; Vasilaky & Leonard, 2018).

The concept of crowding-out as developed though the seminal work of Becker (1974, 1988) and Barro (1974) suggests that newly introduced public transfers will replace private ones. Their theory is motivated by the assumption that the support giver does not gain any utility from their act, but the transfer takes place because it brings utility to the recipient. When a government program comes in and provides a similar transfer the support giver will lose the reason for providing support and stops doing so, while the recipient's utility level remains the same. Alternative models, such as the exchange model (Arrondel & Masson, 2006; Cox, 1987) or social norms (Cox & Jimenez, 1992; Sunstein, 1996) challenge the assumption of altruism and instead motivate that support given by donors includes a component of self-interest. As an example to the exchange model, the empirical study by Bernheim et al. (1986) shows that support of children in the form of visits and phone calls to their parents can be seen as a trade for future inheritance. As a result, when people expect to gain from the support given, either in a tangible form or because it increases their own utility, a total crowding-out effect is unlikely to happen.

Crowding-out is a concern when it threatens to reduce or even nullify the net treatment effect of the government intervention (Amuedo-Dorantes & Juarez, 2015; Cox & Jimenez, 1992). In addition, crowding-out can have negative effects on the size of social support networks and bring already vulnerable population further into isolation (Samuel et al., 2018). However, it should be noted that crowding-out may reduce dependence on the household's direct environment (Ripstein, 2010) and may even empower the main recipient in the household (Bonilla et al., 2017).

The empirical evidence in low or middle-income countries is focused on Latin-America and mainly supports a partial crowding out effect (Albarran & Attanasio, 2002; Angelucci et al., 2012; Juarez, 2009; Teruel & Davis, 2000). Moreover, given the economic origin of crowding-out the majority of evidence concentrates on changes in monetary support. Non-monetary transfers, such as changes in emotional support, have rarely been assessed. Albarran and Attanasio (2002, 2003) find that there is a negative and significant effect on income out of private transfers for social cash transfer beneficiaries after the introduction of PROGRESA in Mexico. However, Teruel and David (2000) when evaluating the PROGRESA with a broader defined treatment group, find no evidence for crowding-out of private monetary transfers and a minimal reduction in non-monetary transfers. Angelucci et al. (2012), who analyze the effect of the same program on an urban sample from 2002-2004, only find crowding-out of the number and value of in-kind transfers. Monetary transfers are not affected at a statistically significant level. In one of the few sub-Saharan African studies, Strobbe and Miller (2011) use a randomized experiment in Malawi and find that the unconditional cash transfer crowds out monetary and in-kind gifts and to some extent remittances but the program has no effect on informal loans. Regarding the magnitude of crowding-out, Jensen (2004) shows that an old age pension in South Africa decreases private transfers from children with 20-30 percent. However, an assessment of a monthly nutrition transfer for senior citizens in Mexico City found that total private transfers decrease with 86 cents for every peso transferred by the demogrant, suggesting a strong crowding out effect (Juarez, 2009). Lastly, Künemund and Rein (1999) find that in high-income countries with generous welfare systems old-age pension increases the instrumental support (i.e. help when ill, help with transportation, taking care of the house), elderly people

received. They suggest that the additional resources received from the government created opportunities for the pensioners to give to their children, who in turn reciprocate with different types of support. While this study included only pensions in higher income countries, the findings indicate that besides (partial) crowding-out, crowding-in is a possible outcome. It should be noted that all these are quantitative studies focusing on the changes in transfers of support, but they are limited in scope to analyze why changes occur.

3. Ghana Livelihood Empowerment Against Poverty (LEAP) 1000

Livelihood Empowerment Against Poverty (LEAP) Program is Ghana's flagship social protection program, which was introduced by LEAP Management Secretariat and the Department of Social Welfare, under the Ministry of Gender, Children and Social Protection in 2008. The program's objectives were twofold with a short-term goal of alleviating poverty and a long-term objective of human capital development. To achieve both objectives LEAP consisted of a bimonthly cash transfer and a health insurance fee waiver for extremely poor households in Ghana. LEAP eligibility included households in poverty with at least one household member being an orphan or vulnerable child, elderly above 65 without support, or severely disabled and unable to work. The initial design was successful in reaching these vulnerable populations, but the program missed other groups such as rural poor families with young children (de Groot et al., 2015; Ghana LEAP Evaluation Team, 2017). In 2015, the LEAP 1000 pilot was launched concentrating on a new category: pregnant women and children under the age of 12 months living in poor households. LEAP 1000 is designed to capture children at a key period of physical and mental development, namely during the first 1000 days of their lives. In alignment to the mainstream program enrolled households receive support for three years with the amount of the support depending on the number of eligible household members. The amount (GH₵76-106 per 2 months) is around 14% of household consumption (Ghana LEAP 1000 Evaluation Team, 2016).

The pilot for LEAP 1000 was rolled out in ten districts in the Northern parts of the country. Priority was given to the poorest communities which were not yet covered by mainstream LEAP. The

pilot captured 6,124 households after one year. By the end of 2015 LEAP 1000 was integrated into the LEAP program, whereby pregnant women and children below the age of one were considered as the fourth category in LEAP. The expanded eligibility criteria for LEAP was used in its nationwide scale up (Ghana LEAP 1000 Evaluation Team, n.d.).

4. Data and Methodology

4.1 Study Design

The impact evaluation of the Ghana LEAP 1000 used a longitudinal mixed-methods design. The evaluation was carried out by UNICEF Office of Research in collaboration with the University of North Carolina at Chapel Hill and two local partners. The quantitative data collection was supported by the Institute of Statistical, Social and Economic Research (ISSER) and the qualitative evaluation was conducted in collaboration with the Navrongo Health Research Centre (NHRC). Baseline data was collected between July and October 2015 and was followed by a midline (September 2016) and endline evaluation (August 2017) for the qualitative component, and an endline survey (July-September 2017) for the quantitative data (Ghana LEAP 1000 Evaluation Team, n.d.). The panel data structure is essential to this study because it allows observation of changes in social support over time (Ruspini, 1999).

I integrate the quantitative and qualitative components using the dimensions of purpose, timing and weighting as described by Guest and Fleming (2014). The purpose of the mixed methods approach was to triangulate and deepen the interpretation and explanatory power of findings on the impact of the social cash transfer on social support **(R. B. Johnson et al., 2007)**. With regards to timing, the data collection was conducted sequentially at baseline. Since the qualitative sample is embedded in the quantitative sample, the latter sample had to be confirmed before the participants for the in-depth interviews could be selected. At the endline survey the data collection occurred simultaneously. Within the mixed-methods study design the qualitative and quantitative components are weighted equally, each concentrating on topics where there is a comparative advantage. The quantitative survey included measures of expenditures, livelihood activities, education and health, while the qualitative in-depth

interviews gathered information on for instance recent experiences with social support in a household and community environment.

4.2 *Quantitative sample*

The quantitative sample (n=2,497) included five of the 10 program pilot districts, including Yendi, Karaga and East Mamprusi in the Northern Region and Bongo and Garu Tempane in the Upper East Region. Treatment and control groups were identified using a regression discontinuity design. The discontinuity is the cut-off score on the proxy-means test (PMT) for eligibility of the LEAP 1000 program, with the treatment group being selected from just below the threshold and the control group from just above. At baseline the treatment group, consisting of 1,262 households, had nearly identical PMT scores to the control group of 1,235 households (see further details Ghana LEAP 1000 Baseline report (2016)). Table 2-1 assesses balance between the two groups at baseline on a range of indicators at the individual[3] and household levels. The two groups are compared while controlling for the level of the PMT scores, acknowledging that differences between households further from the treatment cut-off might be larger. With exception of female household head the differences between the treatment and control group are statistically insignificant at the 5% level.

At endline, 2,331 households (93.4%) of the initial 2,497 households were re-interviewed, of these 2,247 households (90.0%) included an interview with the same LEAP 1000 eligible woman from baseline. I used an individual balanced panel for the analysis, including 1,144 women in the LEAP 1000 treatment group and 1,103 women in the control group (see Table 2-2). After 24-months the attrition rate at the individual level was 10.0 percent. Attrition was non-differential, meaning the baseline balance was the same between the original and attrited sample, and only the proportion of female headed households was significantly different between the two groups (see Annex Table 1A).

[3] The individual level variables are characteristics of the woman eligible for interviewing, meaning pregnant women or mothers with a child below the age of one.

Table 2-1: Household and Individual characteristics of the sample at baseline (with covariate)

Variables	Full Panel sample Mean	*N*	Control (C) Mean	*N1*	Treatment (T) Mean	*N2*	T-C Diff	Diff SE	*p-value*
Household level characteristics									
Household size	6.61	2,497	6.30	1,235	6.91	1,262	0.33	0.18	0.07
# of pregnant women	0.16	2,497	0.17	1,235	0.14	1,262	0.00	0.03	0.90
# of children 0 - 11 mths	0.59	2,497	0.57	1,235	0.61	1,262	0.06	0.04	0.12
# of children 1 - 12 yrs	2.76	2,497	2.52	1,235	2.99	1,262	0.22	0.13	0.08
# of children 13 – 17 yrs	0.45	2,497	0.41	1,235	0.50	1,262	0.02	0.06	0.74
# of adults 18 – 54 yrs	2.38	2,497	2.40	1,235	2.36	1,262	0.00	0.06	0.96
# of adults 55+ yrs	0.42	2,497	0.40	1,235	0.45	1,262	0.02	0.05	0.73
district: East Mamprusi	0.32	2,497	0.33	1,235	0.32	1,262	-0.03	0.03	0.29
district: Karaga	0.19	2,497	0.21	1,235	0.18	1,262	0.02	0.04	0.51
district: Yendi	0.16	2,497	0.15	1,235	0.16	1,262	0.03	0.03	0.31
district: Bongo	0.17	2,497	0.16	1,235	0.18	1,262	0.03	0.03	0.35
district: Garu-Tempane	0.16	2,497	0.16	1,235	0.16	1,262	-0.04	0.03	0.16
Age of head	39.33	2,497	38.26	1,235	40.37	1,262	0.22	0.86	0.80
Head is female	0.09	2,497	0.08	1,235	0.10	1,262	0.05	0.02	0.03
Head is married	0.95	2,497	0.96	1,235	0.95	1,262	-0.01	0.01	0.63
Head no formal schooling	0.80	2,497	0.78	1,235	0.82	1,262	0.02	0.03	0.58
Poverty status: Extremely Poor	0.62	2,497	0.60	1,235	0.64	1,262	-0.03	0.04	0.46
Per capita monthly expenditure (Gh₵)	95.02	2,497	97.73	1,235	92.43	1,262	4.18	4.53	0.36
Individual level characteristics (female respondent)									
Age (years)	29.31	2,497	28.47	1,235	30.13	1,262	0.37	0.56	0.51
Marital status: Monogamous marriage	0.63	2,497	0.64	1,235	0.62	1,262	-0.02	0.04	0.65
Marital status: Polygamous marriage	0.33	2,497	0.32	1,235	0.33	1,262	0.01	0.03	0.77
Marital status: Separated/Widowed/Never married	0.05	2,497	0.04	1,235	0.05	1,262	0.01	0.01	0.63
Education: Less than primary	0.79	2,497	0.78	1,235	0.80	1,262	-0.03	0.03	0.38
Education: Some primary	0.08	2,497	0.08	1,235	0.08	1,262	0.02	0.02	0.42
Education: Completed primary	0.03	2,497	0.03	1,235	0.02	1,262	0.00	0.01	0.96
Education: Some secondary or higher	0.09	2,497	0.10	1,235	0.09	1,262	0.01	0.02	0.66

Notes: The score of the proxy means test is used as a covariate. Expenditure per month is expressed as adult equivalent constant prices for Greater Accra in September 2015 with GH₵ 1 = approximately US$ 0.245. Diff is the average difference between Treatment and Control, and SE is the standard error of this difference clustered at community level.

Table 2-2: Attrition in quantitative sample at household and individual level

	Households			Individuals		
Groups	2015 Baseline	Balanced sample	Attrition Rate (%)	2015 Baseline	Balanced sample	Attrition Rate (%)
Treatment	1,262	1,185	6.1	1,262	1,144	9.4
Comparison	1,235	1,146	7.2	1,235	1,103	10.7
Total	2,497	2,331	6.6	2,497	2,247	10.0

4.3 Qualitative sample

The qualitative sample was embedded in the treatment arm of the quantitative sample, using the quantitative data to identify communities and households to be interviewed. The qualitative sample was stratified across two districts with 10 households each in Bongo (Upper East Region) and Karaga (Northern Region). Bongo is in an area with higher population density and closer access to markets and basic services, and Karaga has a sparser population and communities are located further away from markets and economic activity. The interest in these two districts was to understand the possible differences in the productive prospects of program participants. The samples were further stratified covering 10 households with beneficiary women who were first-time mothers and 10 households where mothers had three or more children (including five in each district). Using parity as a stratification variable was based on the idea that both the number of children and the level of parenting experience may determine spending patterns and therefore program outcomes (Dako-Gyeke & Oduro, 2013; Haddad et al., 1997).

Table 2-3: Qualitative sample at baseline (2015), midline (2016) and endline (2017) in-depth interviews (IDIs)

	Women			Men		
District	Baseline	Midline	Endline	Baseline	Midline	Endline
Bongo (UER)	10	9	9	0	5	8
Karaga (NR)	10	10	8	0	8	7
Total	20	19	17	0	13	15

Table 2-3 indicates the number of interviews with eligible women and their male partners over the three waves. Male partners of the beneficiary women were interviewed from the midline evaluation onwards to give more insight into household and spending dynamics. There is some attrition, because the field team was unable to locate one first-time mother for both follow-up interviews, and two women were traveling for work during the endline interview. From the male partners, four men were not present during the midline interviews, because they had temporarily migrated for work. Two women widowed in the course of the evaluation.

In-depth interviews were conducted by the field team of the Navrongo Health Research Center in two local languages, Dagbani and Frafra. For the baseline interviews there were two female interviewers per district. In the follow-up interviews there was one female and one male interviewer per district to conduct interviews with respectively beneficiary women and their male partners. Where possible I maintained the composition of the field teams throughout the evaluation to provoke recognition and build report with the participants. In addition, the interviewers came from the districts in which the interviews took place increasing familiarity for the participants. At the start of each interview, the field team identified themselves as part of the Navrongo Health Research Center and being unrelated to the government or administration of the LEAP 1000 program. If needed, this was repeated throughout the interview to ensure that participants felt that they could give sincere responses even if this meant sharing experiences which might be considered less socially desirable. However, since I was using impact evaluation data, I acknowledge that it is difficult to eliminate complete association with the program implementation. Based on the varied responses including both positive and negative experiences regarding the program as a whole I believe that I was fairly successful in achieving this objective.

4.4 Quantitative measures and analysis

In order to assess the effect of the LEAP 1000 on social support I use the following difference-in-difference (DiD) estimator:

$$SOC.SUPPORT_{igt}=\alpha + \beta_1 TIME_t + \beta_2 TRANSFER_g + \beta_3 TRANSFER_g * TIME_t + X_i\beta_4 + \varepsilon_{igt} \quad (1)$$

In the equation TIME is the moment of evaluation with t=0 representing the baseline and t=1 the endline. TRANSFER is a binary variable whether a household is in the treatment or control group *g*. Social support (SOC.SUPPORT) was measured for each of the women *i* in three different ways, i.e. overall social support, instrumental support and emotional support, whereby the latter two are subgroups of overall social support. The three measures were derived from a modified version of the Medical Outcomes Study Social Support Survey (mMOS-SS), a measure of social support in the context of basic health care needs (Moser et al., 2012). The mMOS-SS includes eight items measured on a 5-point scale. Included items capture elements of instrumental support (i.e. help if you are confined to bed, help with preparing meals and with daily chores when you are sick, help to take you to the doctor if needed), emotional support (i.e. having people around who understand your problems, or who can give you advice), companionship (having someone to share good times with) and affection (having someone who makes you feel loved) (Moser et al., 2012). Moser and colleagues found that of the original four domains there are two distinguishable subscales consisting of instrumental and emotional support, with the latter combining the domains of emotional support, companionship and affection. Overall social support combines all eight items. The three measures of social support (i.e. overall, instrumental and emotional) were standardized ranging from 0 to 100 to facilitate easy comparison. The breakdown in the measure of social support allows for some differentiation in functionality of the support.

In all models I controlled for proxy-means test score and female household head, which are included in vector X. I ran all estimations with sample weights adjusted for household attrition and robust standard errors clustered at the community level. Findings are presented using community level fixed effects to account for environmental characteristics (e.g. cultural preferences on social interaction and support), which may influence the perceived social support. While I present the DiD estimates with and without fixed effect, the Hausman test confirms that they are different and suggests the use of community fixed effects for all three social support measures.

In addition to the measures of social support, and in line with the focus of the qualitative interviews, I use a measure on social participation, i.e. variables on membership of various community

groups. These variables are only measured at endline and are therefore only estimated as the difference between the treatment and control group.

4.5 Qualitative analysis

Regarding the qualitative data, the interviews were audio-recorded, translated, and transcribed in English. In addition, the field team prepared community descriptions and field notes, describing the context of the interview. From the transcripts and field notes, I created narrative summaries; one for each household including baseline, midline and endline information on the female participant, her partner, and the overall context of the household (Sandelowski, 1995). In the summaries I described social support and social participation, and the changes participants had experienced over time. These summaries were the basis for the development of a codebook. I used Atlas.ti 8 software to systematically code all transcripts using a topical codebook focused on who gives support, what type of support is given, and what changes were experienced in support over time. The output of the coding was used to construct analytical matrices on frequency and type of community support experienced by the participants and to highlight the changes that had been experienced in support throughout the evaluation.

5. Results

5.1 Social support context and description of the sample

The baseline qualitative interviews elicited a detailed inventory of women's social support networks, while the subsequent interviews concentrated more on the changes in the type of support given and the number of people involved. At baseline the women were asked to describe one by one the people who gave them support starting with household members and then moving to people outside the house. In addition, women were asked separately to whom they could turn for specific types of support, such as financial assistance, help with farming, food, or help with household chores or child care. In general, women described their support networks as being composed of members of their household and sometimes a few people from outside the house, who were often relatives and some friends and people in the community. The networks ranged from three to twenty-four people (see Annex Table A2).

Within the household almost everyone provided support to other members, but there were differences in the type of support depending on age and role in the household. Children assisted with small tasks such as fetching water, making errands or playing with smaller children while sisters, sisters-in-law or co-wives, helped with household chores, taking care of the children and cooking of food. In terms of financial contributions, the adult women in the household sometimes farmed, took care of the ingredients (food items or spices beyond the staple grains) and gave small amounts of money to the children to buy school supplies or food. The men mainly provided financial support by contributing farm produce or money. The household head, which in most cases was one of the older, actively working males in the household, was responsible for providing maize or another staple food. In all but two households, women described specific people outside their household to whom they could turn for support.

Most of the support from people outside the household was financial support to help to buy food or pay for hospital bills. Besides support in the form of money, instrumental support was given by people from outside the household. Most of the instrumental support was an extension of household work, such as cooking, washing clothes, doing dishes, but women also talked about help with transportation, farming or assistance when one of the household members fell sick. A mother of seven children in Karaga described how her husband's younger brother brought her to the hospital on his motorbike in the week before the interview. She was suffering from headaches and the brother helped her with transportation and to cover some costs of the medicine. The vast majority of women described a friend or older person (e.g. uncles or aunts, a senior person in the community, an older sister) from outside their household who gave them advice. Elders were associated with providing *'advice'* or '*wisdom'*, while friends provided a wider range of support and companionship, which was generally considered more mutual. A mother of three children in Karaga explained the kind of support she received from a friend:

> *"Like if I give birth and I don't have a cloth to wear she can give me one, or if I give birth, she is the one who goes around to inform people about it, and she can also advise me. If I am bored at home and I don't know what to do I go to her to keep me in company."*

Even though most women mentioned at least one person who gave them advice, emotional support was far less frequently discussed than financial or instrumental support and usually only came up after probing by the interviewer.

This finding is consistent with the perception of the availability of social support in the quantitative measure as presented in Table 2-4. The averages in the social support scales are lower for emotional support than instrumental support at all times for both the LEAP 1000 participants as the comparison group. Instrumental social support, which included among others access to help with regards to transportation, chores and preparing meals, was on average 56.1 and 57.3 (out of 100) for the LEAP 1000 beneficiaries and comparison group respectively at baseline. Emotional social support with questions on having people with to give advice, have a good time with or make you feel loved, scores 48.6 and 50.0 for treatment and control group respectively at baseline.

Table 2-4: Descriptive statistics on the measures of social support

Variables	Full Panel sample Mean	Control (C) Mean	Treatment (T) Mean	(T)-(C) Diff	Diff SE	*p-value*
Baseline						
Social Support score (0-100)	52.98	53.65	52.33	-3.40	1.86	0.07
Instrumental Social Support (0-100)	56.67	57.26	56.10	-3.94	1.98	0.05
Emotional Social Support (0-100)	49.28	50.03	48.56	-2.87	2.12	0.18
Endline						
Social Support score (0-100)	53.76	52.92	54.56	0.10	1.82	0.96
Instrumental Social Support (0-100)	59.33	58.71	59.93	-0.11	2.21	0.96
Emotional Social Support (0-100)	48.19	47.14	49.20	0.30	1.75	0.86
N	2,247	1,103	1,144			

Notes: The score of the PMT and female household head are used as a covariate. Diff is the average difference between Treatment and Control with covariates, and SE is the standard error of this difference clustered at community level.

Another finding from the baseline interviews was that most of the support was reciprocal to some extent, with more binding agreements between more distant relationships. Within the household, exchange of support was often mutual, but was not described as bounded within an exact time, type or amount of support that was expected in return. For example, the support between this first-time mother and her nephew who lived in her household, was that they would exchange farm work for small financial support without calculating an exact remuneration:

> "*He works for me, when we farm rice he assists us and when he also wants to buy something, like books or whatever, I also support him. I buy soap for him to wash his clothes*".

When discussing support from more distant family or community members, women frequently described direct reciprocity or a clear promise of payback in the future. A common example was when the food stocks ran low during the lean season, they borrowed food or money, which they returned later. One of the first-time mothers in Karaga described at the baseline interview:

> *"When the food stock finishes and we have money we buy from the market and if we don't have money we borrow from other people and pay back after harvest in the next farming season."*

The specification that support was part of an exchange, regardless of the level of detail of the reciprocity, gives an initial suggestion that the crowding-out theory is unlikely to hold. The only relationships which seemed more altruistic in nature were those with people closest to the beneficiary, such as parents or a husband. A first-time mother in Karaga gave the following description about the support received from her mother, suggesting that there were no rules to the support given, nor was there a direct promise of returning support later*:*

> *"Whatever challenge I have, whether in terms of money or whatever will give me peace, she is able to support me with it."*

While the support given in this relationship seemed selfless, and therefore subject to possible crowding-out, the support given or received from strong ties might be subject to social norms. The next

section will show the effect on social support after LEAP 1000 is introduced.

5.2 Effects of LEAP1000 on social support

Table 2-5 shows the results of the difference-in-differences estimates on social support. I detected positive and significant effects of the cash transfer program on overall social support with a 2.9 point increase and emotional social support with a 3.5 point increase (both $p<0.05$). On average instrumental social support increased by 2.4 points, although this result was only weakly significant ($p<0.1$). When adjusting for the influence of possible community fixed effects the coefficients change slightly reinforcing the improvement in social support.

Table 2-5: Difference-in-differences estimate with and without community fixed effects

	(1) Social support	(2) Instrumental social support	(3) Emotional social support	(4) Social support	(5) Instrumental social support	(6) Emotional social support
Treatment (LEAP 1000)	-3.07	-3.16	-2.98	-2.03	-1.96	-2.09
	(1.69)*	(1.80)*	(1.83)	(1.67)	(1.80)	(1.77)
Endline	-0.58	1.54	-2.70	-0.43	1.65	-2.51
	(1.16)	(1.52)	(1.08)**	(1.16)	(1.51)	(1.08)**
Treatment*Endline	2.92	2.35	3.48	3.01	2.49	3.53
	(1.22)**	(1.42)*	(1.29)***	(1.25)**	(1.45)*	(1.30)***
Head is female	-4.23	-2.76	-5.69	-5.11	-3.91	-6.31
	(1.59)***	(1.71)	(1.63)***	(1.54)***	(1.65)**	(1.66)***
PMT score	-13.21	-14.74	-11.67	-4.69	-4.01	-5.38
	(8.59)	(9.63)	(8.81)	(8.73)	(9.93)	(8.68)
Community fixed effects	No	No	No	Yes	Yes	Yes
Constant	149.36	164.00	134.72			
	(62.23)**	(69.48)**	(63.95)**			
R^2	0.01	0.01	0.01	0.12	0.11	0.11
N	4,494	4,494	4,494	4,494	4,494	4,494

Notes: Standard errors in parenthesis clustered at the community level. * $p<0.1$ ** $p<0.05$; *** $p<0.01$

The trends over time show that perceived instrumental social support increased for program beneficiaries and the control group, albeit with a larger increase for the former. Emotional social support significantly decreased for the control group, while it increased for beneficiary women. Given that the in-depth interviews were only held with women receiving the transfer I am unable to triangulate these

findings with the qualitative data.

The findings from the in-depth interviews support the quantitative results on the increase in overall social support. The interviews show opportunities to establish new or renew relationships. Several women mentioned that the promise of money coming to their household improved their position to buy items on credit or to borrow money creating new financial resources for these women. In addition, at the endline interview, six women were making contributions to local village saving and loans groups, called susu, or other small-scale microfinance schemes. A mother of three children described the support she got after her husband's death when LEAP 1000 had helped her to make contributions to a local insurance group.

> *"Respondent: I was in a self-help group where we contribute money to support each other in case a member gets a problem. I was the organizer for that group and later promoted to be the president of the group. Later I left the group because I couldn't contribute, but when the LEAP 1000 support started I joined the group again and I was made the group leader again. When my husband died they came to support me with food including rice, cooking oil, tomatoes, bread and cash, and all came from the contributions we do.*
>
> *Interviewer: So how has this benefited you?*
>
> *Respondent: A lot because when my husband died my co-wives' family members came to support them to perform the funeral but my family came and didn't have anything to support me. It was the group support that saved me from disgrace. I had to buy some food on credit and I am waiting for the LEAP money to come so I can pay that debt."*

The self-help group gave financial support when her close relatives could not contribute. In addition, the group members provided companionship and helped to prevent emotional issues, such as shame if she would be unable to contribute to her husband's funeral. The example highlights the complex relationship between financial, instrumental and emotional social support. In this situation the financial

certainty and food contributions from her group members also provided emotional support. Besides, when it came to changes in the access to support interview participants did not differentiate by function of social support, but had a tendency to focus on more tangible examples directly related to the use of the transfer money.

While the results on the modified MOS social support scales are focused on perceived access to social support, the participants in the in-depth interviews also mentioned program effects which went beyond this. The women described a change in their needs for social support and changes in direction of the exchange of social support. First, there was a decrease in need for financial or instrumental support from the informal support network. The LEAP money enabled women to purchase food ingredients without *'bothering'* their male partners. A mother of six children talked about the reduction in the financial support needed from her husband, and the increase in opportunities to assist him:

> *"Ok, it also helps just that I don't worry him [husband] like before. The collecting of the money has made me not to bother him again about ingredients. Also if he needs some money, I can take it and remove some for him to help himself. If it gets finished he won't say that I had money and didn't help him."*

In addition, the increase in self-sufficiency strengthened the control the women have over decision-making in the household. This first-time mother in Bongo described, she no longer had to ask to use the household money:

> *"The difference is that when I was not receiving the money I could not just go and buy something like underwear myself unless I inform my mother but now if I don't have underwear or something I can use some of the money to buy."*

Increased self-sufficiency also changed relationships outside of the household. A number of participants, especially in Karaga, reported that one of the advantages of LEAP 1000 was that they no longer had to go around asking for food or borrowing money. As one mother described she used to

borrow money for basic needs such as food and health care, but since the start of LEAP she can pay for it herself:

> *"It is very good to me because I have done nothing for the government and yet it gives me that money to take care of myself and my children's health, school and feeding. This support has been very helpful in such areas so there is no point borrowing money from people to take care of such needs."*

The reduced need of financial and instrumental social support suggests crowding out of some informal social support. The same respondent elaborated on the relationship with the person who was previously providing her loans. She indicated that she did not borrow money out of her own choice, and not because the opportunity was not available to her. The consequences for her support network were therefore uncertain.

> *"There is no problem between us because I have explained to them that I have a source of income now. Hence, once I earn that little there would be no need to borrow money from them and they understood me."*

Regarding the need for emotional social support, the women discussed having less worries about financial uncertainty, better protection against shocks and less tension in the household; all of which can be considered potential causes of emotional stress. Apart from individual level shocks, the average need for emotional support among beneficiary women might therefore have decreased.

On the second change, some women reported that they could give financial and/or instrumental support when close relatives ask for help. A mother of three children in Karaga explained the change she experienced:

> "*I wasn't able to provider for the family neither talking of helping others and now I can boast of helping the household and others just because of your support from the office."*

Another woman reported that she supported her husband's sister training as a tailor. At the endline interview the sister-in-law was still an apprentice, but the respondent spoke out the hope that in the future she can support them with her new trade. The increase in giving support to others to buy food or to go to the hospital was often accompanied with a positive change in mindset. The participant above referred to 'boasting' of help, while another woman described an increase in self-esteem, because she no longer experienced *'embarrassment when someone asks for support and [she was] unable to help'.*

5.3 Community support and social participation

Seeking more context for the changes in social support I included measures of social participation by looking at group membership (Table 2-6). For women's and religious groups there was a positive difference between group membership of LEAP beneficiaries and the control group (with $p<0.1$) at the endline. Combining all community groups, program beneficiaries were 4.4 percent points more likely to be part of at least one group in the community ($p<0.05$). The in-depth interviews included a similar question, which echoed these results. In the interviews women gave examples how LEAP 1000 enabled them to make the expected contributions to the membership in susu (village savings and loans) or church groups.

Table 2-6: Group membership among beneficiary and comparison women at the endline evaluation

Variables	Control (C) Mean	Treatment (T) Mean	(T)-(D) Diff	Diff SE	*p-value*
Member of agricultural/livestock/fishery group	0.101	0.122	0.008	0.026	0.77
Member of credit or microfinance group	0.176	0.217	-0.023	0.032	0.49
Member of other women's group	0.327	0.404	0.076	0.042	0.07
Member of religious group	0.304	0.314	0.071	0.043	0.10
Member of mutual help or insurance group	0.111	0.125	0.026	0.027	0.33
Member of trade or business groups	0.013	0.024	0.015	0.014	0.28
Member of civic groups or charity	0.011	0.010	0.009	0.007	0.19
Member of local government group	0.000	0.001	0.002	0.002	0.32
Number of groups of which one is a member	1.04	1.22	0.18	0.09	0.05

Member of at least one local group	0.605	0.690	0.123	0.044	0.01
N	1,103	1,144			

Notes: The score of the proxy means test and female household head are used as a covariate. Diff is the average difference between Treatment and Control with covariates, and SE is the standard error of this difference clustered at community level.

Even outside established groups, contributions were considered an obstacle to social participation. One mother in Karaga explained in the baseline interview, how important it is to her to contribute to ceremonies when a baby is born in the community ('*outdooring*'), and how it could be a source of shame if you cannot.

> *"Yes, if for example, someone has an outdooring that I know, whatever you can afford, you don't belittle, you give it out in support so that the person would appreciate that. In those circumstances, you would love to give more and in the event that you get an occasion she will take her turn to honor to the same extent. Failure to contribute becomes a worrying situation whenever you run into the person."*

Lastly, besides LEAP 1000 facilitating the payment of contributions, a few women described that the cash transfer lowered other barriers of social participation. Two women said that previously they were unable to join other women to go to the market, because they did not have money or appropriate clothes. One of the women said that it even helped her children to fit in with their peers:

> *"I couldn't mingle with my colleagues but with the coming of LEAP I can now raise myself and be part of my colleagues (the other women). If I get to the market, I can buy salt or buy a few clothes for my children to wear. Even if don't dress well myself I have been able to dress my children well so they can mix with their peers."*

Figure 2-1: Heterogeneous treatment effects of LEAP 1000 on overall social support (with confidence interval at 95%)

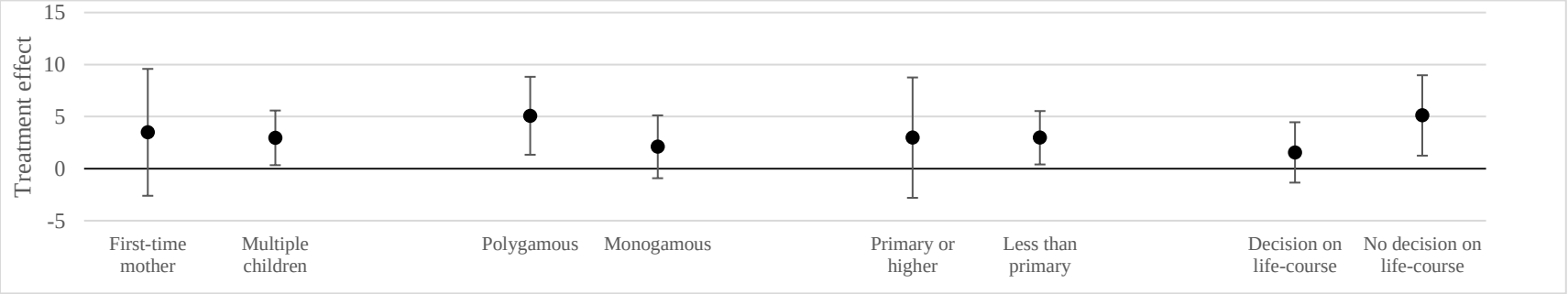


Figure 2-2: Heterogeneous treatment effects of LEAP 1000 on instrumental social support (with confidence interval at 95%)

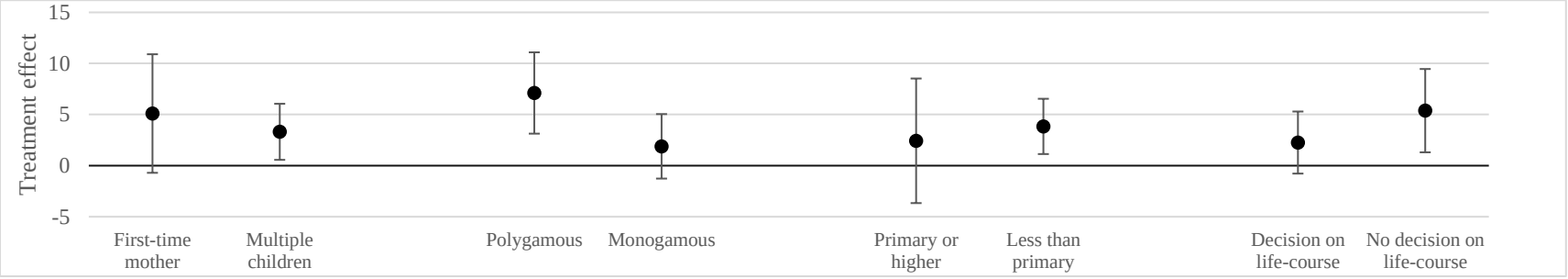
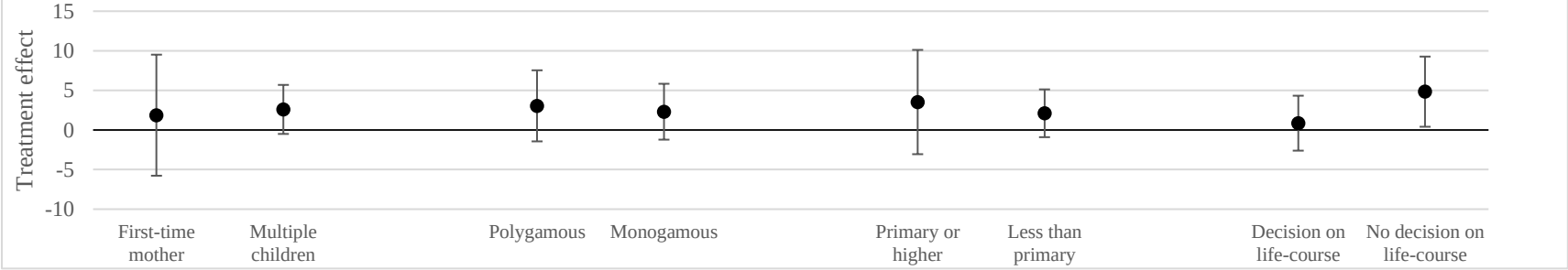


Figure 2-3: Heterogeneous treatment effects of LEAP 1000 on emotional social support (with confidence interval at 95%)



Notes: Treatment effect is the interaction between treatment and time. The estimations are controlled for PMT score and female household head and use community fixed effects. The standard error is clustered at community level.

5.4 Heterogenous effects

As an extension to the quantitative analysis, I explored heterogeneous effects to assess whether the effect on social support differs for various subgroups in the population using variables arising from the qualitative analysis and previous literature (Bonilla et al., 2017; Haddad et al., 1997). I examined the effects of LEAP 1000 on social support by parity (one child versus multiple children), type of marriage (monogamous versus polygamous), level of education (no or less than primary versus primary school and higher) and feeling of empowerment (having power to decide over one's life-course versus no power to decide). See Figures 2-1 to 2-3 for overall, instrumental and emotional social support respectively.

Looking across the various functions of social support, the effect of the cash transfer on overall and instrumental social support is statistically significant at the 5% level for women with multiple children, women in polygamous relationships, women with less than primary education and women, who feel less empowered to make decisions about their own life-course. Women with these characteristics were having lower social support at baseline, suggesting that LEAP 1000 makes a larger difference for those with less social support.

6. Discussion and Conclusion

I found that the LEAP 1000 in general did not negatively influence informal sources of support, such as help with chores, providing food, lending money or providing companionship. The quantitative measures showed an increase in perceived overall, instrumental and emotional social support. The in-depth qualitative interviews confirmed these findings with women experiencing a growth in the access to financial markets and increased opportunities to mingle with peers in the markets, at social gatherings and in community groups. The program even had an enabling role in stimulating changes that led to women creating new relationships and strengthening existing ones. In other words, with the LEAP 1000 program, crowding-out did not outweigh the crowding-in of new opportunities for support.

In comparison to most existing literature, which find partial crowding-out effects (Albarran & Attanasio, 2002; Angelucci et al., 2012; Strobbe & Miller, 2011; Teruel & Davis, 2000), our findings

indicate a more positive picture, since I find opportunities for crowding-in support. The research in Mexico and Malawi (Albarran & Attanasio, 2002; Angelucci et al., 2012; Teruel & Davis, 2000) concentrates mainly on the changes in financial support, while I assessed both instrumental and emotional support. Financial support is a narrower type of instrumental support, including the direct exchange or borrowing of money or goods, but not covering the exchange of services such as help with transportation or chores (Wellman & Wortley, 1990). The discrepancy in findings might be attributed to the use of a different type of social support. In our in-depth interviews I observed some crowding-out of financial social support, when women were describing that they no longer needed to borrow money, or ask friends and relatives for food or other basic goods. Aspects of social support in which I find opportunities of crowding-in such as increased social participation in community groups and greater access to new financial markets, such as self-help groups and susu might not be reflected well in the change in transfers between people.

While the overall interaction between the cash transfer and informal social support from family, friends and community members seemed positive, the analysis highlighted some complexities in the relationship. Firstly, women described that there was no longer a need to take up assistance with regards to food or money leading to crowding-out of previously received support. It remains unclear whether this type of 'crowding-out by choice' resulted in connections being removed from their network on the long-term. Secondly, some women indicated that with the cash transfer they started giving support. It is uncertain whether by giving support they alter their future prospects of support. In addition, giving some of the support to non-beneficiary community members might extend the cash transfer to other poor and vulnerable households creating a spillover effect.

Combining quantitative and qualitative methods strengthened the overall results by being able to confirm findings and by providing more in-depth explanations. However, the use of a mixed-methods approach also underlined the gaps in existing measures. For instance, with the qualitative data it was more difficult to distinguish changes in social support by type than in the quantitative measure. In addition, the quantitative data did not capture the change in the need for social support and the support given by the

LEAP 1000 beneficiaries. While the findings in the qualitative analysis complemented the quantitative results there is room for improvement by developing more inclusive measures on the exchange of social support. The quantitative measure focused on perceived access to social support, in particular in the event of illness, a broader application of covering any time of need would be more suitable for the context. In addition, quantitative measures sensitive to the change in demand for support and whether the support is given as part of mutual help would give further insight in how the various components of social support are changing.

With this paper I assessed the effects of a government-led unconditional cash transfer program on existing social networks, composed of family, friends and community members in the context of rural Ghana. I show that overall the unconditional cash transfer program had an overall positive effect on the use and development of social support networks. I found that the concern of crowding-out and diluting the positive effects of cash transfer programs did not occur beyond a reduction in in-kind and financial loans. However, in these instances the decrease in the use of the social support network came with a gain in self-sufficiency. Crowding-in occurred by strengthening of existing connections and the creating of new economic and social opportunities. Within this context our findings on the impact of unconditional cash transfers on social support networks strengthens the overall positive evidence of the use of cash transfers as a government policy to improve the well-being of vulnerable individuals and households in low-income settings (Daidone et al., 2019; Fisher et al., 2017).

ANNEX

Table A1. Differential attrition on household and individual characteristics (with covariates)

Variables	Full Panel sample Mean	*N*	Control (C) Mean	*N1*	Treatment (T) Mean	*N2*	T-C Mean	Diff SE	*p-value*
Household level characteristics									
Household size	6.70	2,247	6.37	1,103	7.02	1,144	0.31	0.19	0.11
# of pregnant women	0.13	2,190	0.18	1,103	0.14	1,144	-0.00	0.03	0.95
# of children 0 - 11 mths	0.58	2,247	0.56	1,103	0.60	1,144	0.06	0.05	0.17
# of children 1 - 12 yrs	2.84	2,247	2.59	1,103	3.08	1,144	0.17	0.14	0.20
# of children 13 – 17yrs	0.46	2,247	0.41	1,103	0.51	1,144	0.02	0.07	0.82
# of adults 18 - 54 yrs	2.41	2,247	2.42	1,103	2.39	1,144	0.04	0.06	0.53
# of adults 55+ yrs	0.41	2,247	0.38	1,103	0.43	1,144	0.02	0.05	0.74
district: East Mamprusi	0.33	2,247	0.34	1,103	0.33	1,144	-0.03	0.04	0.39
district: Karaga	0.20	2,247	0.21	1,103	0.19	1,144	0.02	0.04	0.66
district: Yendi	0.16	2,247	0.16	1,103	0.16	1,144	0.03	0.03	0.31
district: Bongo	0.16	2,247	0.15	1,103	0.17	1,144	0.03	0.03	0.28
district: Garu-Tempane	0.15	2,247	0.14	1,103	0.16	1,144	-0.04	0.03	0.21
Age of head	39.13	2,247	37.92	1,103	40.29	1,144	0.34	0.86	0.70
Head is female	0.07	2,247	0.06	1,103	0.08	1,144	0.05	0.02	0.02
Head is married	0.96	2,247	0.97	1,103	0.96	1,144	-0.01	0.02	0.40
Head no formal schooling	0.80	2,247	0.78	1,103	0.82	1,144	0.02	0.03	0.57
Poverty status: Extremely Poor	0.62	2,247	0.60	1,103	0.64	1,144	-0.02	0.04	0.54
Per capita monthly expenditure (Gh₵)	120.65	2,247	97.30	1,103	93.05	1,144	6.72	4.89	0.17
Individual level characteristics (female respondent)									
Age (years)	29.58	2,247	28.69	1,103	30.44	1,144	0.13	0.57	0.82
Marital status: Monogamous marriage	0.63	2,247	0.64	1,103	0.62	1,144	-0.01	0.04	0.75
Marital status: Polygamous marriage	0.34	2,247	0.33	1,103	0.34	1,144	-0.00	0.04	0.98
Marital status: Separated/Widowed/Never married	0.04	2,247	0.03	1,103	0.04	1,144	0.01	0.02	0.40
Education: Less than primary	0.80	2,247	0.79	1,103	0.81	1,144	-0.04	0.03	0.24
Education: Some primary	0.07	2,247	0.07	1,103	0.07	1,144	0.01	0.02	0.74
Education: Completed primary	0.03	2,247	0.03	1,103	0.02	1,144	0.01	0.01	0.68
Education: Some secondary or higher	0.08	2,247	0.09	1,103	0.08	1,144	0.03	0.02	0.15

Notes: The score of the proxy means test is used as a covariate. Expenditure per month is expressed as adult equivalent constant prices for Greater Accra in September 2015 with GH₵ 1 = approximately US$ 0.245. Diff is the average difference between Treatment and Control, and SE is the standard error of this difference.

Table A2. Overview of the size and types of support based on social support inventories from qualitative interviews

		Woman living with: parents (husband)	Size of network within the household		Key network members	Size of network outside household		Key network members
			Min	Max		Min	Max	
Karaga, Northern Region	**Total**	**5 (5)**	**2**	**19**		**1**	**8**	
	1st time mothers	4 (1)	2	9	Parents, parents-in-law, husband, siblings	2	7	Husband, brothers-in-law, uncles
	3+ children	1 (4)	2	19	Husband, co-wives, brothers-in-law	1	8	Siblings, uncles/aunts
Bongo, Upper East Region	**Total**	**3 (7)**	**3**	**13**		**1**	**6**	
	1st time mothers	3 (2)	4	7	Husband, parents, siblings, brothers-in-law	2	6	Fathers,[a] mothers,[b] uncles/aunts, neighbors
	3+ children	0 (5)	3	13	Husband, children, mother-in-law, sister/brother-in-law	1	2	Husband, brothers-in-law

[a] Term father often included the woman's father-in-law or other senior male to whom she is close
[b] Term mother often included the woman's mother-in-law

CHAPTER 3 - "STRESS COMES WHEN PEOPLE HAVE NO MONEY FOR FOOD": THE IMPACT OF THE SOCIAL CASH TRANSFER ON STRESS AND PRIVATE SUPPORT IN RURAL MALAWI

1. Introduction

Poverty-related stress is associated with a decrease in mental and physical household well-being (Black & Garbutt, 2002; Cohen et al., 2007; Lund et al., 2010; Patel & Kleinman, 2003), lower caretaker responsiveness and therefore decreased quality of child care (Engle & Black, 2008; Kaiser & Delaney, 1996; Lachman et al., 2014). In low and middle-income countries various aspects of poverty and stress such as food insecurity, low socio-economic status, low educational levels and higher financial stress are associated with mental health disorders, such as depression, anxiety or somatoform disorders (Lund et al., 2010; Patel & Kleinman, 2003). Despite the negative relationship between poverty and psychosocial well-being there is limited evidence on whether interventions focused on poverty alleviation are able to reduce stress and its further consequences (Lund et al., 2011). This chapter assesses the impact of the Social Cash Transfer Program, Malawi's flagship poverty alleviation program, on perceived stress among beneficiary households.

Following the social causation hypothesis, aspects of poverty such as reduced access to resources and services increase the probability of common mental health disorders due to heighted stress, lower social capital, higher risk of exposure to violence (Johnson et al., 1999; Lund et al., 2011). Social protection programs, such as unconditional cash transfer programs, which aim to reduce poverty are assumed to reduce stress by taking away financial strain and therefore reducing a key stressor (Johnson et al., 1999; Thoits, 1995). In addition, in the case of unconditional cash transfer programs providing households with financial resources enables household members to remain in control of household spending and let them address those issues which are considered most urgent (Standing, 2008). The

empirical findings are ambiguous (Lund et al., 2011). Haushofer and Shapiro (2013) find that an unconditional cash transfer in Kenya affects recipients happiness, life satisfaction and perceived stress level, but not cortisol levels, which are often used as biomarkers for stress. In their analysis of an unconditional cash transfer program in Zambia, Hjelm et al. (2017) find insignificant effects of the intervention on perceived stress levels. These findings are similar to Paxson and Schady (2007), who use measures of maternal perceived stress and depressive symptoms as an outcome variable to the cash transfer in Ecuador and find no statistically significant results. However, Ozer et al. (2011) find a positive effect of the conditional cash transfer *Oportunidades* on maternal mental health, measured as the incidence of depressive symptoms in Mexico.

One reason for the variation in the findings can be the interaction of cash transfer programs with other buffers of stress, such as social support (Cohen & McKay, 1984; Thoits, 1995). If the introduction of a cash transfer program reduces the amount of private support being received by the beneficiary household, the overall program effects and therefore the effects on stress might become diluted (Barro, 1974; Becker, 1974). Existing literature is inconclusive, but finds mostly evidence for a partial crowding-out effect, meaning that some of the private transfers are still made, but less frequent or smaller than prior to the introduction of the public intervention (Albarran & Attanasio, 2003; Cox & Fafchamps, 2007; Juarez, 2009; Strobbe & Miller, 2011). The evidence on the impact of large-scale cash transfer programs in sub-Saharan Africa on private transfers is limited. In addition, the existing literature has not focused on combining quantitative and qualitative methods to triangulate results and deepen the understanding of the findings. In this study I use a mixed-methods approach to assess the impact of the Social Cash Transfer programme on perceived stress taking into account possible changes in private support.

This study has three main findings. First, difference-in-differences estimates show that the cash transfer program has a positive impact on decreasing perceived stress of the main caregiver. The qualitative in-depth interviews gave a clear insight in the reduction of stress since the caregivers, especially with regards to worries about food and children's school needs. Second, using the same difference-in-differences estimation strategy there was no effect of the cash transfer on access to,

receiving or giving financial social support. The qualitative findings validate these results with stories of beneficiaries still needing to turn to people outside the household when the cash transfer ran out. With regards to giving social support, the majority of caregivers stated that they did not give any more transfers than before the start of the program, because the transfer amount was not even enough for themselves. Some provided small support to household members and close family in need. Third, the moderation effect does not indicate a differential impact on stress for households with or without private support at baseline. This suggest that in this case not private transfers, but the cash transfer is the main buffer against poverty-related stress.

The next section describes the Social Cash Transfer programme and study context, and section 3 covers methods and ethics. In section 4 the quantitative and qualitative analysis are described, including the measures, sample and estimation strategy used. The results of the quantitative and qualitative analysis are presented respectively in Section 5 and 6, followed by a discussion and conclusion.

2. Study Context: the Malawi Social Cash Transfer Programme

The Malawi Social Cash Transfer Programme (SCT) is a government-led and co-sponsored program targeted at ultra-poor and labor constrained households. The program is operated by the Ministry of Gender, Children and Community Development in cooperation with the Ministry of Economic Planning and Development and UNICEF Malawi, which provide policy oversight and advice. In2013 the program reached around 100,000 individuals in 30,000 households, and in 2015 this increased to 100,000 households (Carolina Population Center, 2014, 2015). The origins of the program were directly related to the country's commitment to social protection and poverty reduction. The government of Malawi in collaboration with UNICEF developed a strategy to provide support to caregivers of orphans and vulnerable children (OVCs). These two initiatives in combination with international and regional advocacy for the use of social cash transfers led to development of the Social Cash Transfer program. The objective of the program is to mitigate orphanhood poverty and the transfer is targeted at households which are ultra-poor, meaning unable to provide basic food and non-food items, and labor constrained,

defined as a ratio of 'fit to work' to 'unfit to work' of more than three. The SCT program's eligible households are determined through a community-based identification approach. A community social support committee comprised of assigned community members indicates which households are eligible to receive the transfer. The transfer level varies by household size and the number of children enrolled in school. The average amount (MWK560 per capita) is around 28% of pre-transfer consumption (Carolina Population Center, 2014).

3. Methods

3.1 Study Design and Data Collection

The data for this study come from the longitudinal mixed-methods impact evaluation of the Social Cash Transfer Programme. The quantitative component was designed as a clustered randomized controlled trial (RCT). The evaluation consisted of three waves, a baseline survey in July 2013 prior to the start of the transfer, a midline survey (November 2014), and an endline survey (October 2015). . The qualitative component consists of an embedded sample of 16 household of which in-depth interviews were conducted with caregivers and youth at all three of the waves.

For the quantitative data collection, randomization occured at two levels. After the initial pilot program the SCTP was expanded to two districts, Salima and Mangochi, of which Traditional Authorities were randomly selected in each district to be included in the study. Further randomization occurred at the village level, of 29 village clusters 14 were assigned to the treatment group and 15 were the control group. Control group households were eligible households, which were planned to enter the program with a delayed entry of 28-months (Carolina Population Center, 2014).

The RCT design provides a unique opportunity to assess the impact of the cash transfer on social support and on stress. The availability of embedded qualitative data allows for complementing the analysis with perspectives of beneficiaries.

3.2 Ethics

This study was approved by the Institutional Review Board at the University of North Carolina at Chapel Hill and at the Ethics Review Board for the Center of Social Research in Malawi prior to starting the program evaluation.

4. Analysis

4.1 Quantitative Analysis

4.1.1 Measures

The two main outcomes of interest are indicators of financial support by people outside the household, and psychosocial well-being in the form of stress.

Private social support through transfers: As a measure of social support I am using receipt or provision of transfers from or to any individual not living in the household as measures following e.g. Albarran and Attanasio (2003), Jensen (2004) and Strobbe and Miller (2011). Private transfers included food, cash, labor or time, or agricultural input over the past 12 months. If a category was not received the respondent was asked whether the household would have had such transfer available to them when needed. For the same categories of food, cash, labor and time the respondent was asked whether they provided any of these transfers to someone outside the household. I constructed three indicators: any transfer received or available as a proxy for the access to social support; any transfer received, as a proxy for actual social support; any transfer provided as a measure of social support given. With these three measures I can measure the changes in the social support network regardless of any change in needs, the changes in need of social support after the introduction of the cash transfer and lastly whether the cash transfer enables giving of support.

Cohen stress scale: A simplified version of the Cohen stress scale was available for all three waves of data collection, including four questions: (1) ‘In the last month, how often have you felt that you were unable to control the important things in your life?’, (2) ‘In the last month, how often have you felt confident about your ability to handle your personal problems?’, (3) ‘In the last month, how often have

you felt that things were going your way?', (4) 'In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?'. All questions are answered on a 5-point scale with 0 means always and 4 means never (with positively phrased questions being reverse-scored) and added up to a 0-16 point scale. Maximum points suggest lowest possible stress levels (Cohen et al., 1983). The Cohen 4-item stress scale is commonly used instrument to measure individual well-being and is used by e.g. Kilburn et al. (2017), Addo et al. (2011) and Paxson and Schady (2010).

4.1.2 Attrition and Sample Balance

At baseline in 2013 3,531 households were included in the sample of which 1,678 households (48%) were selected for treatment (see Table 3-1). Of these households 3,396 households were present in the baseline and endline, with 1,611 households (47.4%) in the treatment group and 1,785 in the comparison group (52.6%), leading to attrition of 3.8% from the baseline sample. The attrition analysis in Annex A1 indicates that there are some statistically significant differences between the attrited and the panel sample, namely on some of the household composition indicators, expenditure per capita and female household head. The outcome and input variables of interest do not show any differential attrition.

Besides the attrition between the three waves there was some sample loss due to unavailability of the same individual respondent across waves. Since one of my main outcome variables is an individual well-being indicator, a balanced sample at the individual level was used. As a consequence, I was able to use 84.0 percent of the original baseline sample.

Table 3-1: **Sample build-up**

	Households			**Individuals**		
Groups	**2013 Baseline**	**Balanced sample**	**Attrition Rate (%)**	**2013 Baseline**	**Balanced sample**	**Sample loss (%)**
Treatment	1,678	1,611	4.0	1,607	1,354	15.6
Comparison	1,853	1,785	3.7	1,770	1,484	16.2
Total	3,531	3,396	3.8	3,377	2,838	16.0

Note: Individual sample is comprised whether the same individual answered the question regarding stress (main outcome variable).

For the estimation strategy, which is explained in the next section, I relied on the randomized research design. Table 3-2 indicates balance across a number of household and individual level variables at the time of the baseline survey. The number of elderly people, districts, per capita expenditure and age of main respondent were statistically significant at the 1% level. The variables showing any imbalance were included as covariates in the analysis to assure that any differences prior to receiving the cash transfers is not affecting outcomes. In terms of sample description, both the SCT beneficiaries and the control group were households with a large proportion of school-age children, and a somewhat older main respondent. This is consistent with the target group of households where family (especially grandparents) are taking care of orphans and vulnerable children. In addition, all households were extremely poor and have an average annual expenditure per capita of US$140 to US$129 (MK 46,102 and MK 42,683) for SCTP and control households respectively.

Table 3-2: Sample balance of the SCT and control groups at baseline (2013)

	(1) SCTP treatment Mean	(2) Control Mean	(3) Difference (1)-(2)	(4) P-value
Household size	4.49	4.57	-0.08	0.32
No. of children under 5	0.55	0.57	-0.02	0.49
No. of children 5-17	2.23	2.33	-0.10	0.10
Number of adults (18-64)	1.10	1.12	-0.02	0.56
Number of elderly (65+)	0.62	0.56	0.06	0.01
District: Salima	0.46	0.51	-0.05	0.01
District: Mangochi	0.54	0.49	0.05	0.01
Per Capita Expenditure	46,102	42,683	3,420	0.01
Age of Main Respondent (in years)	57.83	56.02	1.69	0.01
Main Respondent is Female	0.87	0.88	-0.02	0.38
Main Respondent is Married (monogamous/polygamous)	0.27	0.28	-0.00	0.59
Main Respondent Never Married	0.01	0.01	-0.00	0.86
Main Respondent Widowed	0.45	0.43	0.02	0.17
Main Respondent Divorced/Separated	0.26	0.28	-0.02	0.34
Main Respondent ever attended school	0.32	0.30	0.02	0.28
Main Respondent is literate	0.18	0.18	0.00	0.86

Main Respondent has chronic disease	0.72	0.71	0.00	0.76
Any transfer received or would be available in last 12 months	0.84	0.87	-0.03	0.03
Any transfer received in last 12 months	0.81	0.84	-0.03	0.02
Any transfer provided in last 12 months	0.30	0.33	-0.02	0.10
Cohen stress scale (0-16)	5.13	4.96	0.24	0.17
N	*1354*	*1484*		

Note: At baseline exchange rate is 330 MWK=US$1.

4.1.3 Estimation strategy

I examine the impact of the cash transfer program on stress, as a measure of individual well-being, and on the access, receiving and giving of private transfers, as a measure of social support, using difference-in-differences estimations. The exogenous variation in the estimation comes from the randomization of SCTP treatment. The estimation strategies are as follows:

$$Transfer_{igt}=\alpha + \beta_1 Time_t + \beta_2 SCT_g + \beta_3 SCT_g * Time_t + X_i\beta_4 + \varepsilon_{igt} \quad (1)$$

$$Stress_{igt}=\alpha + \beta_1 Time_t + \beta_2 SCT_g + \beta_3 SCT_g * Time_t + X_i\beta_4 + \varepsilon_{igt} \quad (2)$$

The time indicator is 0 at baseline, and 1 at the endline during 24-month follow-up. The midline, which took place 12 months after the baseline is not presented in this paper given that findings were more pronounced after 2 years when there had been time to internalize changes. All 12-month results are available upon request. For the transfer outcome three transfer variables are used namely transfer received or available, transfer received or transfer provided. All are recorded with a recall period of 12 months. The stress outcome uses the Cohen Stress scale with ranges from 0 to 16.

Due to some of the baseline imbalances after attrition the difference-in-differences are estimated using covariates (X) on household composition, district, per capita expenditure at baseline, age, gender, marital status, whether ever attended school and literacy of main respondent, and whether main respondent has some sort of chronic disease.

In addition to the impact analysis of the cash transfer, I conducted a moderation analysis to examine whether the impact of cash transfers on stress is different for households with private transfers at

baseline. Cash transfers and social support can both function as buffers to stress (Berkman & Glass, 2000; Haushofer & Shapiro, 2013; Lund et al., 2010). However, if cash transfers crowd-out private transfers then it is likely that there is less stress reduction among households with transfers at baseline than other households due to some dilution of the treatment effect. The moderation analysis is estimated using a triple interaction model whereby SCTP treatment is combined with time and a baseline support variable. The analysis helps to understand whether household, which had some form of social support at baseline were differentially affected by the cash transfer.

4.2 Qualitative Analysis

4.2.1 Data Collection and Preparation

Longitudinal qualitative data has an advantage of being able to capture changes over time while providing a contextual understanding of the dynamics in beneficiaries lives. It elicits narratives which go beyond one snapshot in time and allows for building up rapport between the field team and participants which enables deeper conversations (Holland, Thomson, & Henderson, 2006; Saldaña, 2003).

The field work was conducted under the lead of the national partner of the project, the Center for Social Research. The field team, which was trained by experts in qualitative interview techniques, prepared for follow-up interviews by using of living summaries on each of the participants. These summaries were prepared by the research team and updated after each round of data collection. The summaries allowed for initiating interviews with some familiarity of their family situation making it easier to create a connection with the participant. It also enabled following up on issues raised in the previous interview. Each of the interviews were audiotaped and the field team prepared field notes after each interview capturing impressions about the interview, non-verbal exchanges and other comments about the interview context. Following the field work the field team translated and transcribed the recordings.

4.2.2 Analysis

The analysis for this chapter is based on the transcripts of the in-depth interviews with caregivers and youth participants and the field summaries. After initial reading of the notes and transcripts I identified broad themes on stress and health, the cash transfer and social support. Around these three themes I created analytical summaries (Sandelowski, 1995). One summary was made for each household condensing the relevant content of the interview by wave as well as including notes on context under what circumstances the interviews took place. In addition to the summaries I made use of matrices to capture the longitudinal element of the analysis, for instance I made a matrix on the main sources of stress per household at baseline, and noted whether the participant mentioned an increase, decrease or no change at midline and endline. Similarly, I noted when changes in social support were experienced and when participants expressed opinions about the cash transfer program. From the summaries and matrices I further specified the three themes as 'baseline stress', 'impact of the cash transfer on stress', and 'changes in private social support' as they were used in the analysis.

4.3 Mixed-Methods integration

Data collection was done sequentially with the quantitative fieldwork in each wave being done before the qualitative interviews. The initial sequencing was done to select the qualitative sample from the quantitative treatment sample, as to embed the two samples. The quantitative and qualitative analyses were conducted independently with only the availability of quantitative indicators on program participation, social support and stress guiding the development of themes in the qualitative analysis. Besides the study design, the integration of the methods was mostly done at the point of interpretation. The quantitative analysis was used to establish the effect of the cash transfer program on social support and stress. The qualitative analysis helped to understand the process in which these changes took place and the value beneficiaries attached to it. The two methods complemented the understanding of the changes in stress and private support experienced by cash transfer beneficiaries (Creswell et al., 2011).

5. Quantitative Results

The difference-in-differences estimate shows that the Social Cash Transfer had a positive effect on the Cohen Stress scale and therefore decreased stress with program beneficiaries having a 1.3 point increase on the Cohen Stress scale (Table 3-3). When controlling for household and main respondent's characteristics the magnitude of the impact remains nearly the same (1.3 out of a 0-16 scale). The controlled model is statistically significant at the 5% level.

Table 3-3: Impact of the cash transfer on Cohen Stress scale

Dependent variable: Cohen Stress scale (0-16) VARIABLES	(1)	(2)
SCTP treatment	0.264	0.260
	(0.564)	(0.545)
Endline	0.631*	0.633*
	(0.349)	(0.362)
SCTPxEndline	1.268**	1.275**
	(0.562)	(0.566)
Age of Main Respondent		-0.014***
		(0.004)
Main Respondent is Female		-0.271
		(0.170)
Main Respondent Never Married (Ref: Main Respondent Married)		-0.800*
		(0.397)
Main Respondent Widowed		-0.306*
		(0.167)
Main respondent is divorced or separated		-0.077
		(0.156)
Main Respondent ever attended school		0.020
		(0.211)
Main respondent is literate		0.120
		(0.159)
Main respondent has some chronic disease		-0.302**
		(0.111)
District: Salima (Ref: Mangochi)		-0.056
		(0.289)
No. of children 5-17 (Ref: No. of 0-4 yrs)		0.067*
		(0.037)
No. of adults (18-64yrs)		0.127*
		(0.062)
No. of elderly (65+yrs)		0.058
		(0.084)
Log. of per capita expenditure		0.631***
		(0.108)
Constant	4.934***	-0.622
	(0.347)	(1.172)

Observations	5,675	5,675
R-squared	0.065	0.093

Notes: Clustered standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

The effect of the cash transfer on transfers available, received or provided is positive, although statistically insignificant for all three measures (Table 3-4). The direction of the coefficient would suggest a small percentage point increase of access to transfer, transfers received or given by the program beneficiaries, however, statistically the results for beneficiaries and control households are not different. In other words, the cash transfer does not affect the probability for households to receive or give out transfers to people outside the household.

Table 3-4: Impact of cash transfer on transfer access, transfers received and provided

VARIABLES	(1) Any transfer received or would be available	(2) Any transfer received or would be available	(3) Any transfer received	(4) Any transfer received	(5) Any transfer provided	(6) Any transfer provided
SCTP treatment	-0.055	-0.054	-0.058	-0.058	-0.043	-0.031
	(0.038)	(0.039)	(0.045)	(0.045)	(0.042)	(0.043)
Endline	-0.112**	-0.105**	-0.122**	-0.115**	0.008	0.012
	(0.044)	(0.042)	(0.048)	(0.046)	(0.063)	(0.064)
SCTPxEndline	0.065	0.063	0.074	0.071	0.044	0.045
	(0.061)	(0.061)	(0.068)	(0.067)	(0.089)	(0.089)
Age of Main Respondent		0.001**		0.002**		-0.003***
		(0.001)		(0.001)		(0.001)
Main Respondent is Female		0.021		0.016		0.023
		(0.020)		(0.022)		(0.026)
Main Respondent Never Married (Ref: Married)		0.076		0.055		-0.192***
		(0.054)		(0.051)		(0.037)
Main Respondent Widowed		0.008		0.020		-0.036
		(0.018)		(0.020)		(0.026)
Main respondent is divorced or separated		0.015		0.025		-0.000
		(0.025)		(0.024)		(0.022)
Main Respondent ever attended school		0.005		-0.002		0.016
		(0.026)		(0.027)		(0.023)
Main respondent is literate		-0.001		0.001		-0.008
		(0.019)		(0.018)		(0.016)
Main respondent has some chronic disease		0.001		-0.007		-0.029**
		(0.017)		(0.020)		(0.012)

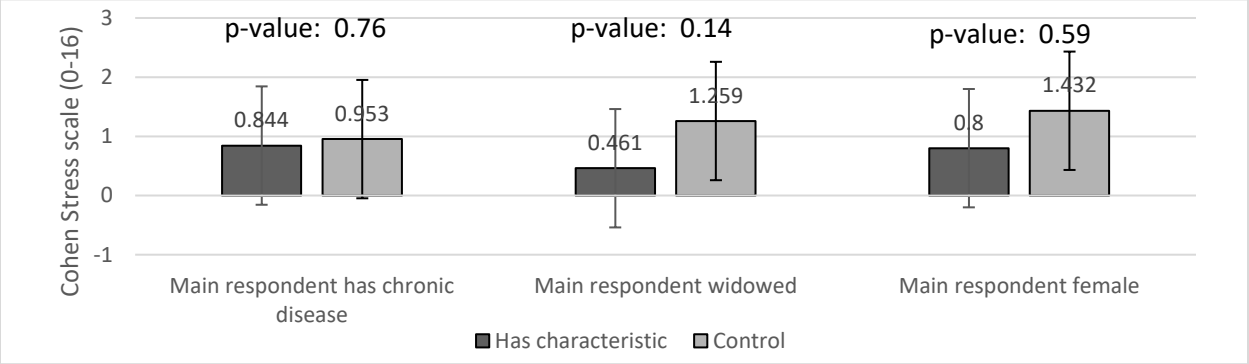
District: Salima		0.078**		0.075*		0.160***
(Ref: Mangochi)		(0.037)		(0.043)		(0.035)
No. of children 5-17		-0.017***		-0.022***		0.008
(Ref: No. of 0-4 yrs)		(0.005)		(0.004)		(0.005)
No. of adults (18-64yrs)		-0.038***		-0.045***		0.020*
		(0.012)		(0.012)		(0.011)
No. of elderly (65+yrs)		-0.024		-0.030		0.024
		(0.016)		(0.019)		(0.018)
Log. of per capita expenditure		0.013		0.009		0.069***
		(0.012)		(0.014)		(0.016)
Constant	0.878***	0.708***	0.856***	0.734***	0.326***	-0.342**
	(0.024)	(0.127)	(0.030)	(0.155)	(0.030)	(0.160)
Observations	5,676	5,676	5,676	5,676	5,676	5,676
R-squared	0.013	0.045	0.014	0.054	0.002	0.058

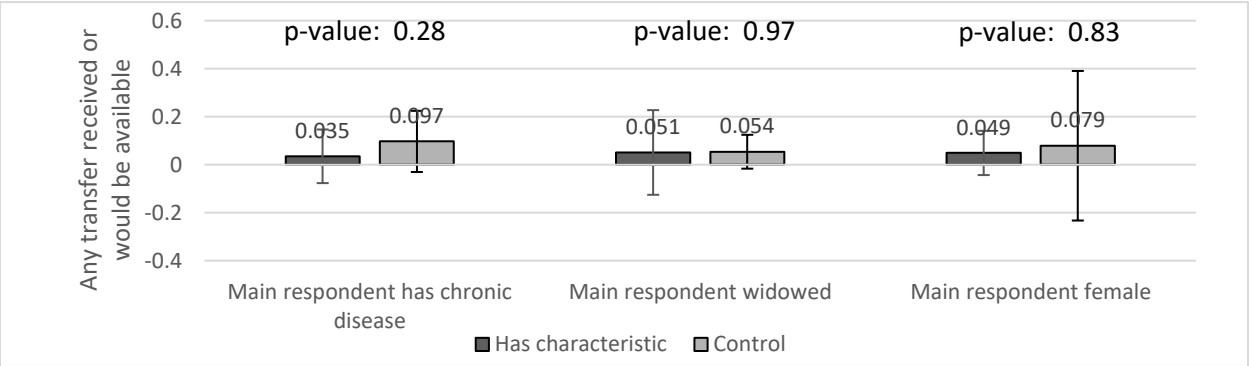
Notes: Clustered standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

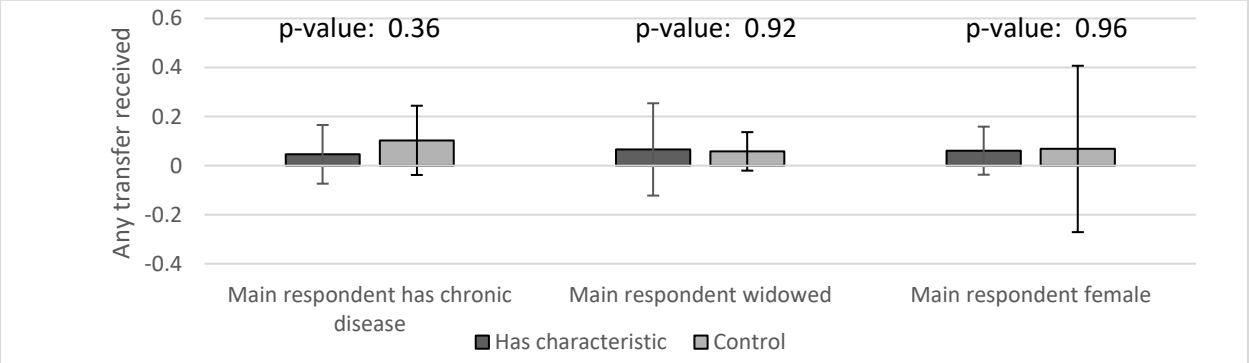
5.1 Heterogeneity analysis

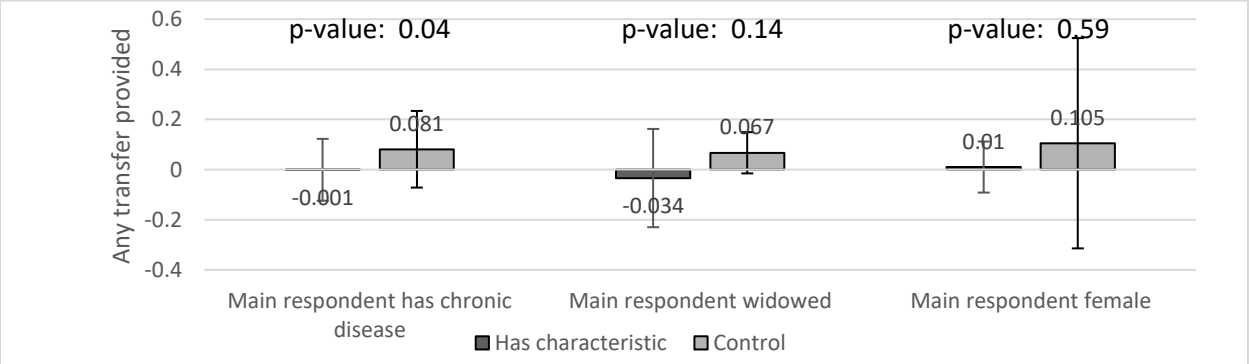
Due to the vulnerable nature of the sample population, I analyzed the impact of the cash transfer on stress and private transfers separately for households with specific characteristics. I examined differences in households where the main respondent had a self-reported chronic disease, the main respondent was widowed or the main respondent was female (Figure 3-1). The effects for respondents who has a chronic disease, was widowed or female are smaller than for households where the main respondent did not report a disease, is not widowed and male. For almost all the results the differences between having any of the abovementioned characteristics is not statistically different from not having the characteristic. Only households where the main respondent has a chronic disease are less likely to give transfers to any person outside the house than households where the main respondent does not have a chronic disease at a 5% level. The latter might indicate that households with a member with a chronic disease have less to share as compared to other households, even when receiving the cash transfer.

Figure 3-1: Impact of Cohen Stress scale, transfers access, received, provided by characteristics









Notes: P-value represents the outcome of a Wald-test between the difference-in-difference outcomes for households with and without the mentioned characteristics.

5.2 Moderation analysis

To further understand the interaction between cash transfers and private transfers, I analyzed whether having received or given baseline private transfers changes the effect of cash transfer on stress. The analysis gives insight whether private transfers provide any accumulate or substitute effect to the relationship between public cash transfer and stress (Table 3-5). The triple interaction coefficient does not indicate a differential effect for households with or without private transfers at baseline (available, received or given), meaning that households with access to private transfers prior to receiving the cash transfer were neither more or less likely to experience a reduction in stress.

Table 3-5: Impact on Cohen stress scale using social support variables as moderator

VARIABLES	(1) Cohen stress scale (0-16)	(2) Cohen stress scale (0-16)	(3) Cohen stress scale (0-16)	(4) Cohen stress scale (0-16)	(5) Cohen stress scale (0-16)
Moderator:			Transfer received or available at baseline	Transfer received at baseline	Transfer given at baseline
SCTP treatment household	0.264	0.260	0.385	0.437	0.581
	(0.564)	(0.545)	(0.758)	(0.719)	(0.657)
24 month follow-up	0.631*	0.633*	0.055	0.212	0.933**
	(0.349)	(0.362)	(0.569)	(0.559)	(0.448)
TreatmentX24-month follow-up	1.268**	1.275**	1.122	0.957	0.970
	(0.562)	(0.566)	(0.835)	(0.802)	(0.684)
Moderator			-0.665	-0.729	1.488***
			(0.421)	(0.435)	(0.526)
TreatmentXmoderator			-0.196	-0.276	-0.921
			(0.515)	(0.505)	(0.613)
24-month follow-upXmoderator			0.658*	0.492	-0.965*
			(0.334)	(0.368)	(0.476)
TreatmentX24-month follow-upXsupport moderator			0.230	0.433	0.934
			(0.585)	(0.596)	(0.633)
Age of Main Respondent		-0.014***	-0.013***	-0.013***	-0.011***
		(0.004)	(0.004)	(0.004)	(0.004)
Main Respondent is Female		-0.271	-0.267	-0.271	-0.310*
		(0.170)	(0.167)	(0.165)	(0.170)
Main Respondent Never Married (Ref: Main Respondent Married)		-0.800*	-0.785*	-0.798*	-0.622
		(0.397)	(0.390)	(0.397)	(0.396)
Main Respondent Widowed		-0.306*	-0.300*	-0.295*	-0.234

		(0.167)	(0.164)	(0.164)	(0.169)
Main respondent is divorced or separated		-0.077	-0.073	-0.066	-0.053
		(0.156)	(0.152)	(0.152)	(0.162)
Main Respondent ever attended school		0.020	0.011	0.003	-0.036
		(0.211)	(0.208)	(0.209)	(0.210)
Main respondent is literate		0.120	0.125	0.130	0.138
		(0.159)	(0.160)	(0.159)	(0.156)
Main respondent has some chronic disease		-0.302**	-0.308***	-0.312***	-0.244**
		(0.111)	(0.108)	(0.106)	(0.109)
District: Salima (Ref: Mangochi)		-0.056	-0.051	-0.061	-0.080
		(0.289)	(0.290)	(0.288)	(0.280)
No. of children 5-17 (Ref: No. of 0-4 yrs)		0.067*	0.061	0.055	0.054
		(0.037)	(0.036)	(0.036)	(0.038)
No. of adults (18-64yrs)		0.127*	0.115*	0.104*	0.115*
		(0.062)	(0.060)	(0.060)	(0.060)
No. of elderly (65+yrs)		0.058	0.046	0.036	0.043
		(0.084)	(0.083)	(0.083)	(0.086)
Log. of per capita expenditure		0.631***	0.632***	0.629***	0.541***
		(0.108)	(0.108)	(0.106)	(0.107)
Constant	4.934***	-0.622	-0.026	0.074	-0.256
	(0.347)	(1.172)	(1.175)	(1.164)	(1.196)
Observations	5,675	5,675	5,675	5,675	5,675
R-squared	0.065	0.093	0.097	0.099	0.108

Notes: Clustered standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

5.3 Control group analysis

Lastly, to further test the relationship between private transfers and stress, I examined the association between private transfers and stress among the control group only. While the relationship between private transfers and stress is likely to be endogenous due to omitted variables such as e.g. shocks, self-sufficiency, the relationship is not causal. The association suggests that households, which received any transfer in the past year scored lower on the Cohen Stress scale (and therefore showing more stress), while households which had given a transfer scored higher on the scale (Table 3-6). Households which had private transfers received or available did not show any significant relationship with stress. These results can be interpreted as households which received private transfers had a higher need of support and therefore possible higher levels of poverty-related stress. Households which were in the position to provide support indicated less stress at baseline. These results hold even when controlled for per capita expenditure, but reduced over time.

Table 3-6: Control group analysis: interaction between transfers and time

Dependent variable: Cohen Stress scale (0-16) VARIABLES	(1)	(2)	(3)	(4)
24-month follow-up	0.205	-0.101	0.121	0.341
	(0.345)	(0.564)	(0.534)	(0.395)
Any transfer received or would be available		-0.450		
		(0.311)		
Any transfer received or would be availableX24-month follow-up		0.351		
		(0.319)		
Any transfer received			-0.429	
			(0.277)	
Any transfer receivedX24-month follow-up			0.104	
			(0.308)	
Any transfer provided				0.974***
				(0.312)
Any transfer providedX24-month follow-up				-0.457
				(0.272)
Age of Main Respondent	-0.011**	-0.010**	-0.010**	-0.007
	(0.004)	(0.004)	(0.004)	(0.005)
Main Respondent is Female	-0.210	-0.215	-0.221	-0.224
	(0.220)	(0.219)	(0.219)	(0.216)
Main Respondent Never Married (Ref: Main Respondent Married)	-0.155	-0.158	-0.162	0.087
	(0.424)	(0.422)	(0.416)	(0.398)
Main Respondent Widowed	-0.512**	-0.514**	-0.512**	-0.420*
	(0.198)	(0.192)	(0.194)	(0.198)
Main respondent is divorced or separated	-0.219	-0.227	-0.229	-0.147
	(0.175)	(0.172)	(0.174)	(0.181)
Main Respondent ever attended school	0.012	0.012	0.017	-0.033
	(0.197)	(0.198)	(0.198)	(0.200)
Main respondent is literate	0.255*	0.258*	0.254*	0.290*
	(0.139)	(0.141)	(0.138)	(0.138)
Main respondent has some chronic disease	-0.404***	-0.410***	-0.414***	-0.336***
	(0.057)	(0.053)	(0.053)	(0.061)
District: Salima (Ref: Mangochi)	-0.189	-0.213	-0.226	-0.202
	(0.340)	(0.346)	(0.344)	(0.327)
No. of children 5-17 (Ref: No. of 0-4 yrs)	0.005	0.001	-0.003	-0.005
	(0.037)	(0.036)	(0.036)	(0.037)
No. of adults (18-64yrs)	0.130*	0.120*	0.113*	0.128*
	(0.068)	(0.063)	(0.063)	(0.063)
No. of elderly (65+yrs)	0.095	0.087	0.081	0.074
	(0.073)	(0.070)	(0.070)	(0.080)
Log. of per capita expenditure	0.743***	0.745***	0.736***	0.645***
	(0.128)	(0.128)	(0.128)	(0.134)
Constant	-1.253	-0.845	-0.749	-0.791
	(1.337)	(1.351)	(1.344)	(1.384)
Observations	4,335	4,335	4,335	4,335
R-squared	0.038	0.040	0.040	0.052

Notes: Clustered standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

6. Qualitative Results

The qualitative findings are mainly focused on the caregivers' responses to the in-depth interviews, whereby the youth participants' interviews were used for verification and clarification of the caregivers' statements. The participating households were all cash transfer beneficiaries, and therefore by definition extremely poor. From the sixteen households, fifteen were fostering one or more children at some point during the evaluation. Most of these households were headed by grandmothers who were taking care of the grandchildren either because the parents were deceased or were not able to take care of them. Thirteen households were headed by a single caregiver and six households indicated that at least one of the members experienced a chronic disease. The qualitative results are presented around three themes consisting of poverty-related stress at baseline, the impact of the cash transfer on stress, and changes in social support.

6.1 Baseline poverty-related stress

Understanding the experience of poverty-related stress at baseline is essential to describe the role stress plays in the lives of beneficiaries, and to place potential changes due to cash transfer in context.

All caregivers indicated that at some point during the past year they experienced food shortages. Most households had their own farm land and harvested some food, but due to the size of the farm, lack of fertilizer or adverse weather circumstances the stock would usually run out before the harvesting season. Having enough food for the household and for the children in particular was one of the main worries of the participants. A second main concern from the caregivers was about the children's ability to attend school. School absenteeism happened due to hunger, but also because caregivers did not have soap to wash uniforms or money to pay school fees. In addition, some of the children had to help with doing day labor (ganyu) in exchange for money or food in times of food insecurity. Thirdly, caregivers were concerned about the future of their children, whether they could stay in school or not, and early pregnancies and marriages. Lastly, there were a number of other concerns expressed by the participants, such as worries about obtaining money to start a business and with that secure an income, about lacking

of money to buy fertilizer or increase farm yields in other ways, or fear for illnesses or other health shocks, which would bring about large medical expenses. One household was living temporarily in borrowed housing after their own houses had collapsed. The caregiver was worried that the owners would tell them to move before they were able to build a new house. All of this stress was related to basic needs, such as food, education, health care and shelter. Jamila[4] was one of the single, female caregivers at baseline, who lived with her five children and one grandchild in Mangochi. The caregiver experienced a lot of stress. She mentioned that *"stress comes when people have no money for food*". She worried a lot about food, but also about the children's development, and their clothes: "*I worry all the time where I will find the money to buy these basic needs".* She continued: *"I worry about how I am going to adequately feed the children, that maybe they will not grow well. Also, I worry about the way the children dress, they don't dress well."* Her story was indicative of most beneficiaries, which mentioned food and being able to take care of their children's needs as main sources of stress.

6.2 Impact of the cash transfer program on stress

The majority of the caregivers talked about how their worries had been reduced since they started receiving the cash transfer both at 12 months and 24 months after the initial visit. In particular, the caregivers highlighted their ability to provide food for their households. Caregivers and youth participants explained that both the quantity and the quality of food eaten had improved. Multiple households that had skipped breakfast prior to the start of the cash transfer program, were able to have three meals a day. Other households described that they had previously begged for maize husks at the grinding mill to mix with in order to make the food last longer. After the start of the program, they no longer had to beg for husks. Three households indicated that they were able to borrow money to address food insecurities and paid back as soon as the new program payment occurred. Access to food reduced a lot of the caregivers' worries.

In addition, caregivers expressed relief that they improved their ability to take care of their

4 All names are pseudonyms to protect participants' identity.

children's needs. Caregivers had stress about various aspects of the children's education and life, as described by this beneficiary: '*Before the program, I was thinking will I ever have money to buy enough food for my children? Will my children ever go to school without being sent home because of school uniforms?'*. Since she got the support, she did not have the same worries anymore. The children in the household were missing less classes, because they could afford uniforms, soap to keep the clothes clean or necessary school and exam fees. Caregivers talked about the hope to keep children in school as long as possible.

Although, concerns about food and their children seemed to be addressed by the cash transfer to some extent, almost all households indicated that the cash transfer amount was insufficient. Caregivers, who indicated the time period, mentioned that the cash transfer would last them not even half of each payment period, namely between three weeks and a month. They described experiences of uncertainty and stress during these periods. One of the beneficiaries said that she was happier and worried less since she started receiving the cash transfer, but that at times she still had concerns about food: *'Where am I going to get food when the money I receive is finished?'*. In the remainder of the time the households had to employ coping mechanisms as they used to do before the start of the program. Most households would have one or more household members do ganyu-labor, and if that would still be insufficient they would ask friends or family for loans or support.

Agnes was a single mother, who lived with three of her own children and one foster child. Her husband died prior to the start of the evaluation, and after his death she found out that she was HIV positive. Agnes mentioned at the baseline that "*Some people have problems, but me I have a lot of problems"*. Her problems included finding food for the household, managing farming activities of the household even when she was too weak to do it herself, her illnesses and ARV treatments. Agnes felt that the cash transfer made changes to their ability to obtain food and in taking care of her school-going child: "*we have been receiving money from the cash transfer program and I bought clothes for my son. I feel things have changed a little because I also bought notebooks and a school uniform for him."* However, at the endline she explained that the transfer lasted them about three weeks. Agnes gave an example when

she experienced a shock on top of their general struggles regarding food:

> *"Respondent: There was a time when we had no food in the house and at the same time one of my children was sick and needed immediate attention. We did not have enough money to buy food and take him to the hospital.*
>
> *Interviewer: What did you do?*
>
> *Respondent: I asked my neighbor for 700 Kwacha, which we used to buy maize and relish, then I used some of the money I had from the cash transfer program for transportation and medical bills."*

Agnes' experience was pretty common among the sample, whereby participants indicated a general improvement in their lives, but were still highly vulnerable to shocks. The need to rely on social support, such as on the assistance of friends and family mostly came in at times of emergency. In addition, while stress was reduced in general, worries about food and other expenses remained at times when the cash transfer ran out.

6.3 Changes in private transfers after introduction of the cash transfer program

The social support networks of most of the participating households were small at baseline. At least nine households indicated only having a few people to turn to when they were running short on food or money. Single, female caregivers often expressed how the children suffered from not having the support from a father. For many it also meant not having access to additional (in-law) family. Annie, a single mother taking care of six children, including one child with a disability, living in Salima explained that she had no parents and no siblings to reach out to. One of her children moved out of the house and got married, he sometimes provided small financial assistance, but he is poor also and therefore has not much to share. The same applied to her neighbors, who all live in poverty. At baseline she said:

"I have neighbors but I cannot say they can help me when I am in need, even if I went there to beg porridge, they cannot give me any. They say you should be independent. So my son is they only one I depend on."'

She suggested that besides her child she has nobody nearby to go to, because all of them are facing financial constraints.

Three caregivers talked about not wanting to beg or ask for support. Two of them mentioned that they did not want to ask family or neighbors for assistance. One older lady explained that most of the support she got was from 'well-wishers' who offered her help, but she did not want to request help from family herself. She said with some degree of pride that her family should ask her, an older and less mobile grandmother, who had problems doing physical labor, whether she needed support, rather than her begging for it.

On the question whether the cash transfer beneficiaries were sharing the cash transfer, eight caregivers indicated that they were not using any of the transfer to support their family and friends. As main reason they explained that the cash transfer was already insufficient to fulfill their own basic needs for the entire period, let alone that they would have money to spare. Caregivers from five households, however, said that they were giving more support. The support giving households were not necessarily better off than the ones who indicated that the money was not even enough for themselves. The support provided was either part of ongoing mutual support, or the households felt that at the time of asking they had some food or money to share. These results are comparable with the quantitative analysis on providing private support, which showed some indication of an increase in support given but no significant changes.

Annie, who told that she could not ask her neighbors for help because of poverty, explained at endline that her relative position in the neighborhood had improved and since the introduction of the cash transfer program she had been able to share some food to others:

"Respondent: Yes, it has changed. I am able to assist my neighbors with some food. They are my relatives and they are not in the Mtukula Pakhomo [cash transfer] programme.

Interviewer: What was the situation before Mtukula Pakhomo?

Respondent: As I was the poorest person, I wasn't giving them any food. We, however, just shared the little food we were able to get that time. There is now a change now I am better off."

7. Discussion

This study explores the impact of Malawi's flagship poverty alleviation program, the Social Cash Transfer, on caregivers' perceived stress and social support from family and friends outside the household. The motivation for this study is twofold. First, to assess the cash transfer program's impact on stress at the individual level. Second, to improve the understanding of possible crowding-out of financial social support, which might dilute overall program effects and the impact on stress in specific.

The association between poverty and stress has been a well-established field of study in high-income countries (Belle, 1990; Saraceno et al., 2005). Research in low-income countries is more recent (Lund et al., 2010; Patel & Kleinman, 2003) but shows, similar to the high-income country research, a mostly positive relationship. Given the relationship, poverty alleviation programs might have an effect on beneficiaries' psychosocial wellbeing. The pathway through which stress will be reduced is by alleviating financial stressors. Assessments of interventions have had ambiguous findings, with some programs reducing stress and improving mental health (Haushofer & Shapiro, 2013; Lund et al., 2011; Ozer et al., 2011), whereas others showed no significant difference (Hjelm et al., 2017; Paxson & Schady, 2007). The difference-in-differences results of the current study indicated a decline in stress due to the cash transfer program. This result was echoed by the experiences of beneficiary caregivers in the qualitative evaluation.

The theoretical literature on crowding-out private by public transfer programs discusses whether public transfers replace or crowd-out of public transfers (Barro, 1974; Becker, 1974) or whether public transfers once introduced complement existing private transfers (Cox, 1987; Cox & Jakubson, 1995). The empirical literature focused on cash transfer programs suggests mostly a partial crowding-out effect

(Albarran & Attanasio, 2003; Jensen, 2004; Kazianga, 2006), although there are some that show no effect (Teruel & Davis, 2000) or even a crowding-in effect (de Milliano et al., n.d.). The results for this study, exploring the randomization of cash transfer and employing a difference-in-differences estimate, indicate that there was no effect on the private support available, received or given to people outside the beneficiaries' households. These findings suggest that there is no crowding-out of private transfers.

The findings from the qualitative analysis provided a possible reason for inconsistency with the existing literature by showing that the households in general thought that the cash transfer program was insufficient to cover all their needs and therefore to lift them out of poverty. Kazianga (2006) finds that in Burkina Faso crowding-out was less likely among the poorest households, because even with the new support they still lacked resources. The findings in this study, which is conducted among extremely poor households, is consistent with these results, suggesting that the cash transfer program did not show a crowding-out effect because the transfer on its own did not fulfill all the households' needs. In addition, lack of a crowding-out effect suggests that it is unlikely that any of the changes in stress due the cash transfer are influenced by changes in private support.

The moderation analysis examining whether the effect of the cash transfer program on stress is different for households which had received, had access to or given private support at baseline indicated that there is no statistically significant difference between households with and without support. While social support can function as a buffer to poverty-related stress (Thoits, 1986, 1995), in this case the additional value beyond the cash transfer is negligible. This suggests that the cash transfer is the main buffer. The control group analysis even shows that the households which have been receiving financial support were associated with higher stress levels. However, households giving any support had lower stress. These associations might indicate that households which were in higher need of receiving support had higher stress levels, while households that were having some financial room to give were experiencing less stress.

8. Conclusion

The findings in this study suggest that the social cash transfer program in Malawi has a positive effect on caregivers' psychosocial well-being. These results are not diluted by crowding-out of any private transfers given that the analysis did not indicate any effects on the receiving or giving of transfers by family, friends or other acquaintances outside the household. The reduction in stress in combination with the lack of a crowding-out effect contributes to existing positive existing evidence of unconditional cash transfer programs on individual and household well-being.

ANNEX

Table A1: Sample construction and attrition

	(1) Baseline sample (2013) Mean	(2) Panel Mean	(3) Attrited Mean	(4) Difference (2)-(3) P-value
SCTP household (treatment)	0.48	0.47	0.50	0.62
Household size	4.55	4.61	3.24	0.00
No. of children under 5	0.56	0.56	0.41	0.04
No. of children 5-17	2.23	2.27	1.35	0.00
Number of adults (18-64)	1.14	1.16	0.76	0.00
Number of elderly (65+)	0.62	0.62	0.73	0.06
District: Salima	0.50	0.51	0.33	0.00
District: Mangochi	0.50	0.49	0.67	0.00
Per Capita Expenditure	45,059	44,344	63,047	0.00
Age of Main Respondent (in years)	57.28	57.06	62.90	0.00
Main Respondent is Female	0.83	0.83	0.75	0.01
Main Respondent Married (monogamous/polygamous)	0.30	0.30	0.26	0.31
Main Respondent Never Married	0.03	0.03	0.03	0.94
Main Respondent Widowed	0.43	0.42	0.53	0.02
Main Respondent Divorced/Separated	0.25	0.25	0.19	0.09
Main Respondent ever attended school	0.33	0.33	0.26	0.09
Main Respondent literate	0.20	0.20	0.22	0.68
Main Respondent has chronic disease	0.72	0.73	0.60	0.00
Any transfer received or would be available in last 12 months	0.85	0.85	0.87	0.40
Any transfer received in last 12 months	0.82	0.82	0.86	0.25
Any transfer provided in last 12 months	0.31	0.32	0.25	0.11
Cohen stress scale (0-16)	5.08	5.09	4.77	0.28
N	*3531*	*3396*	*135*	

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