The Impact of an Unconditional Cash Transfer on Child Health: A Production Function Approach

**Description of the Topic to be Studied**

This year marks the 25th anniversary of the Convention on the Rights of the Child and the conclusion of the Millennium Development Goals (MDG) timeline. Despite gains in all dimensions of child well-being, problems persist. Millions of children die from preventable causes, lack access to essential services, and live in extreme poverty. As the global development community looks to the future with the 2030 Agenda for Sustainable Development, new opportunities exist to reach the most disadvantaged populations through integrated social and public health systems.\(^1\),\(^2\),\(^3\)

An estimated 6.3 million children under-five died in 2013, with 1.1 million of these deaths concentrated in Eastern and Southern Africa (ESA). Nearly half of young child mortality can be linked to malnutrition, which is associated with an increased likelihood of death from common childhood ailments such as diarrhea, malaria, and pneumonia.\(^4\),\(^5\) Inadequate nutrition leaves children more susceptible to frequent illness and exacerbates the severity of common childhood diseases to the point of permanent damage to child growth and development.\(^6\),\(^7\) Poor growth indicators are a consequence of poor nutrition, repeated infections, and diarrhea. Worldwide, an estimated 162 million children under-five are stunted, 100 million are underweight, and 51 million are wasted.\(^8\),\(^9\)

More than one-third of the global extreme poor are children under age 13, and half of all children in low-income countries live in extreme poverty.\(^2\),\(^4\),\(^5\) Children living in poverty are at the highest risk for limited health service access, inadequate nutrition, and poor health outcomes.\(^10\)

Limited use of preventive and curative health care is a fundamental driver of poor health among low-income children. Between 2009 and 2013 in ESA only half of children with symptoms of pneumonia sought care, less than one-third received antibiotic treatment, and less than 40 percent of children with diarrhea were treated with oral rehydration salts.\(^5\) Socioeconomic-based health inequalities among children are worsening.\(^11\)

Poor health and early child malnutrition are of critical concern because of their mutually reinforcing relationship over the life-course. Nutritional status as young as age two has been demonstrated to influence outcomes later in life. Malnourishment in early childhood has been linked with a reduced cognitive capacity,\(^12\),\(^13\) lower levels of educational attainment,\(^10\),\(^13\),\(^14\) and reduced adult economic productivity.\(^10\),\(^15\) As poverty is both a cause and an outcome of poor human capital development in children with cumulative and long-term effects, country and development actors are beginning to favor social welfare programs that address the root causes of poverty and poor health outcomes.\(^5\)

Unconditional cash transfers (UCTs) are rapidly becoming a cornerstone of African social protection programs and government policies, growing in response to the intergenerational transmission of poverty, chronic hunger, and low levels of human capital accumulation. In 2008, the African Union adopted the Social Policy Framework for Africa, calling for the codification of social protection coverage into national development strategies. In 2010, UCTs were operating in about half of the countries on the African continent, and as of 2013, 27 African countries were implementing some form of UCT as a component of social safety net programming.\(^16\)

The Government of Malawi (GoM), in partnership with UNICEF, implemented the Social Cash Transfer Program (SCTP) as a pilot in Mchinji district in 2006. Since then, several adjustments have been made to the SCTP and the program has been expanded to reach 18 out of 28 districts. As of March 2015, the SCTP had reached over 100,000 beneficiary households and gone to full scale in 10 districts. The program is expected to have enrolled over 175,000 households by the end of 2015. The SCTP is an unconditional cash transfer program targeted to ultra-poor, labor-constrained households. The SCTP transfer amount varies by household size and the number of household members enrolled in school.\(^17\)

Short-term evaluations of the Mchinji SCTP pilot scheme from 2007-2008 provided evidence of positive program impacts on household food security, curative care seeking, child
While these studies were able to attribute positive gains in child health to the program, the studies did not provide information about the pathways through which the cash transfer is affecting child health outcomes. Continuing to build this evidence base can help to focus attention in the post-2015 development agenda on the importance of demand-side interventions for the poorest of the poor, integrated social protection and public health systems, and the potential for social safety net programs to generate positive externalities.

**Theoretical Focus**

The proposed research is guided by the combination of two seminal frameworks from economics and public health. Becker’s and Grossman’s theories of the household and of health production are mapped onto Mosley and Chen’s analytical framework for the study of child survival in developing countries. The frameworks are then adapted to a conceptual model of the theory of change that relates the Malawi SCTP to child health outcomes.

Mosley and Chen’s 1984 framework organizes the distal and intermediate factors that influence child health and survival. The framework is based on the recognition that child morbidities and mortality represent the culmination of a series of detrimental effects, and that distal socioeconomic factors must operate through proximate determinants that directly influence child health outcomes. Individual, household, and community characteristics make up the socioeconomic determinants, and the proximate determinants include maternal factors, environmental contamination, nutrient deficiency, injury, and personal illness control.

The economic theory of the household’s demand for child health, child health inputs, and production of child health is taken from Becker’s 1965 theory on the allocation of time and Grossman’s 1972 theory on the demand for health and human capital. Becker’s key contribution to human capital theory was the recognition that households make decisions and allocate resources in a process in which they are both consumers and producers of goods. The household produces commodities that directly enter their utility function through the application of purchased inputs and time. The household decides the quantity of inputs to consume by maximizing their preferences subject to income, time, and other resource constraints that they face. These inputs and time are then combined through the production function to produce the commodity of interest. Grossman’s main contribution to human capital theory was the application of Becker’s framework to model the demand for the commodity of “good health”.

A simple model for the demand for child health inputs and the production function for child health can be derived using these theories of choice. As proposed by Mosley and Chen and elucidated through the economic model of household production, socioeconomic determinants such as household income, wealth, and caregiver skills work through the proximate determinants – the demanded child health inputs – to produce child health. Thus, demand analysis characterizes the relationship between distal and proximate determinants and production analysis describes the relationships between proximate determinants and child health outcomes given socioeconomic determinants. Three critical assumptions of the model are that the household makes decisions as if it were an individual (unitary model), that households are rational actors, and that caregivers know how to produce healthy children.

The Malawi SCTP enters the household demand and production functions through its income effect on the household budget constraint; as a result of the transfer, beneficiary households will have more disposable income. Any potential impact of the transfer program on child health outcomes must work through the household’s spending and time allocation decisions. Accordingly, the household must use transfer resources to increase demand for child health inputs such as nutritious foods and preventive and curative health services to improve child health outcomes. Any impacts of the SCTP on child health will be second round impacts because they are not influenced...
directly by the transfer, but rather first require the direct effect of the transfer on household consumption and time allocation.

**Data**

This study uses longitudinal data from the experimental, mixed-methods, cluster-randomized impact evaluation of the Malawi SCTP in Mangochi and Salima districts. The baseline survey was conducted from July – September 2013 and the midline survey from November 2014 to February 2015. The endline survey is scheduled for late-fall 2015. Two traditional authorities were randomly selected from each district, and after the baseline survey concluded half of the village clusters (VCs) were randomly assigned to treatment and the others to a delayed-entry control group.

At baseline, 3,531 eligible households were sampled in 29 VCs, resulting in 14 treatment VCs (1,678 households) and 15 control VCs (1,853 households). Analysis of baseline data determined that randomization was successful as no significant differences were found between treatment and control households across a range of study indicators. Over 95 percent of baseline households were re-interviewed at midline (3,369 households). No evidence of differential or overall attrition between treatment and control households was found at the midline follow-up, indicating that baseline balance between treatment and control groups – as well as the representativeness of the sample – was preserved.\(^\text{17}\)

**Research Methods**

This study estimates and reports the household input demand and production function equations together. The majority of empirical applications of the health production framework are limited by data to estimating only input demand functions or reduced-form health equations where the input demands are treated as exogenous.\(^\text{29}\) This study uses the full system of equations to present an impact pathway analysis, tracing the effects of the SCTP through changes in household demand for child health inputs to final child health outcomes produced by the household. This approach allows for program and policy recommendations to be based on knowledge about how the demand and production system works and multiple points where improvements in targeting or opportunities for integrating the cash transfer with complementary programs exist.

The outcomes of interest in the input demand analysis component of this study serve as key (instrumented) covariates in the health production model. While multiple health input demand equations will be included, only a few are of primary interest in this study. Nutrition inputs of interest include key food and nutrition security indicators, such as the number of times per day the child is fed solid food, household kilocalories per capita, a household diet diversity score, and household food group shares. Health service inputs include having a health passport, participating in a nutrition program, and receiving a well-baby/under-five check-up in the past six months. The child health outcomes of interest include continuous measures of child height-for-age, weight-for-height, and weight-for-age Z-scores, as well as binary indicators of whether the child had an illness involving diarrhea, fever, or a cough in the past two weeks.

The exposure of interest is receipt of the Malawi SCTP and is analyzed as both a dichotomous indicator and as a continuous measure of a “dose”, or transfer level. The transfer level is equal to the per capita value of the transfer as a percent of per capita household expenditure at baseline.

Both the demand and production function analyses examine the presence of program impact heterogeneity based on baseline poverty and caregiver health knowledge. The first moderator of interest is whether the household was among the poorest 50 percent of households at baseline. The health knowledge score is obtained by extracting the first factor from principal component analysis
with a polychoric correlation matrix using a series of eight questions about complimentary infant feeding, micronutrients, treatment for diarrheal disease, malaria, and tuberculosis.

The collection of baseline data and subsequent follow-up surveys was designed to allow for a difference-in-differences (DD) approach to quantifying the SCTP program impact, or the changes in beneficiary welfare that can be attributed directly to the program. The primary sample of interest for this study is all children ages six to 59 months old residing in panel households by survey round – this allows for a pooled regression DD approach using 1,759 children from baseline and 1,534 children from midline. The analytic approach used in this study will be instrumental variables combined with DD. The demand equations will be modeled first as functions of exogenous determinants such as prices, distance to services, availability of services, and other valid instruments, and will include the SCTP and time indicators to estimate the DD parameter. This system of input demand equations will be jointly estimated using seemingly unrelated regression (SUR) in order to increase estimation efficiency and allow for cross-equation hypothesis testing (e.g., to determine if there are differential Engel curves for child health and child health inputs by household and input type). Results from SUR will then be used to instrument the input demands in the second stage estimation of the health production functions. A triple difference estimator will be implemented in both sets of equations to test hypotheses regarding heterogeneous program impacts by poverty and health knowledge, as well as differential impacts by transfer level.

Regression analyses will control for baseline characteristics of the household head, the demographic composition of the household, dwelling characteristics, geographic location, participation in other programs, and community variables such as distance to markets and health centers, local prices, and infrastructure. Parameter estimates will be corrected for the multi-stage survey design and sample weights will be applied to understand the program impact on the population of interest.

**Expected Results**

The objectives of this study are to evaluate the impact of the Malawi SCTP on young child nutrition and health outcomes, and to determine the key mechanisms through which the SCTP improves young child welfare. To achieve these goals, we investigate the determinants of both the household demand for child health and child health inputs and of the household production of young child health. We hypothesize that beneficiary households will have increased demand for child health and child health inputs, and that the program impact on household demands will be greater among the poorest households, those households with a higher level of caregiver health knowledge, and households with higher transfer shares. With respect to child health outcomes, we hypothesize that the SCTP will improve child nutrition and health outcomes, and that program impacts will be greater for poorer households, households with higher caregiver health knowledge, and households with greater transfer shares.

Preliminary results indicate overall positive program impacts on the number of meals households consume per day, worry over having enough food to eat, the food share, and the incidence of wasting and the use of curative care among young children. Impacts are stronger for the poorest 50 percent of households, with increases in per capita expenditure levels, food and health expenditures, and the use of curative care among young children. Simulation results of the expected transfer amount each household is expected to receive indicated that the average transfer amount is 18 percent of pre-program consumption. This is below the general rule of thumb of a minimum 20 percent among programs with demonstrated positive household welfare impacts, with important implications for the range and depth of impact the program can achieve.
13 Adato M, Bassett L. Social protection to support vulnerable children and families: The potential of cash transfers to protect education, health and nutrition. AIDS Care. 2009;21(S1):60-75