Underweight Children in Ghana: Evidence of Policy Effects

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Extended Abstract

Introduction

Sub-Saharan Africa is second from the bottom in terms of rate of progress towards a reduction in the proportion of underweight children (United Nations, 2009). The region's marginal progress (three percent fall between 1990 and 2007) in reducing underweight children is currently further threatened by the on-going food price increases being experienced, mostly, in developing economies. In Ghana, the proportion of children who are stunted is 14 times the level expected in a healthy, well-nourished population (Measure + DHS program, 2005). Increasing disposable income and deepening knowledge through education have been prioritized to combat child wasting, stunting and underweight.

Objectives

The broad objective of this study is to examine the effects of policies designed to improve child health.

The specific objectives are to;

- Examine the effect of mother's wealth, body mass index (BMI) and education on child's weight-for-age;
- Investigate the effect of policy interventions (both health and financial interventions) on child's weight-for-age; and
- Assess differential effects for communities and different socio-economic categories of children.

Hypotheses

- Mother's wealth and education have a significant positive effect on child nutrition; and
- Localities that have received child health related policy intervention (s) has (have) better anthropometric measures.

Methods

This paper analyses both national and community level policy interventions that were instituted in Ghana, with the aim of improving child health from 1990 to 2006. We use pooled data from four rounds (1993-98-03-08) of Ghana's Demographic and Health Survey to examine determinants of child's weight-for-age (combination of stunting and wasting).

The difference-in-difference approach is used to evaluate the differential effect of interventions for communities and over time.

Structural Models explored

The general set-up of quantile regression, equation 1 below is solved from an optimization perspective using linear programming.

$$\hat{\beta}_{(\tau)} = \arg\min_{\beta_\tau \in \Re^K} \sum_{i=1}^{n} \rho_\tau \left(y_i - x'_i \beta \right) - - - 1$$

where estimated $\beta_{(\tau)}$ called 'tauth' (τth) regression quantile estimates the coefficient at a specified threshold (τ). τ is the sample quantile and takes on any value that between 0 and 1. The expression $\rho_\tau \left(y_i - x'_i \beta \right)$, the absolute value function, weights the absolute difference between y_i and $x'_i \beta$ with τ and by (1 – τ) for all observations below the estimated hyperplane. Koenker and Basset (1978) estimates conditional quantiles using the minimization procedure synonymous to least squares.

The structural equation for child nutrition is specified as;

$$cn_{it} = \alpha_0 + \delta_0 d_l + \alpha_1 T + \delta_1 d_l * T + \lambda_{it} \beta + \varepsilon_{it} - - - 2$$

In equation 2 above, cn_{i_t} is an outcome indicator for child nutrition say weight-for-height for child (*i*) at time (*t*). '*d*' and '*T*' respectively represent a vector of dummy variables for communities (*l*) that received some form of health or financial intervention and time. 'β' symbolizes a set of mother, father and household characteristics with particular attention to household's wealth, mother's BMI and educational level of both parents. Finally, ε_{it} is a vector of zero mean random error term.

Key Child Health Policies in Ghana since 1988 include:

1. Exclusive breastfeeding
2. Safe Motherhood Initiative
3. National Health Insurance
4. Creating Wealth through Health
5. Free Delivery Health Services in all Health Facilities
6. Strategic document for child health
7. Nutrition Unit

The study uses variants of both reduced forms and other models including: instrumental variable estimation; pseudo panel estimation; treatment effect estimation; and causal mediation analysis to explore the policy effects. The extent to which these models are used depends on the source of endogeneity being examined.

Preliminary Observations from available Data

This study proposes to use five rounds of the Ghana Demographic and Health Survey (GDHS) and the 2006 Multiple Indicator Cluster Survey (MICS). This section provides initial graphical and tabular observations which will be further processed analytically using the multivariate options indicated above.

Table 1 - Cleaned GDHS for Analysis

Rounds	Number of Observations
1988	1841
1993	1862
1998	2635
2003	3094
2008	2368

Bivariate Observations

Figure 1 - Trends of Anthropometric Measures

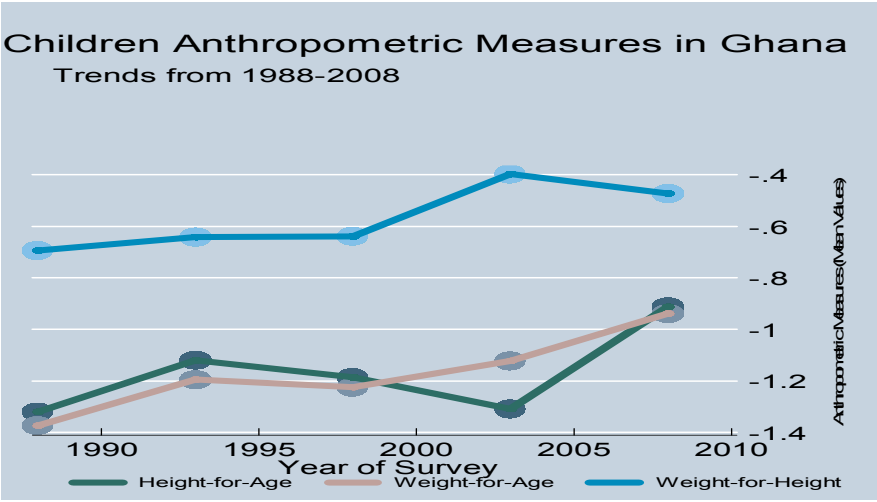
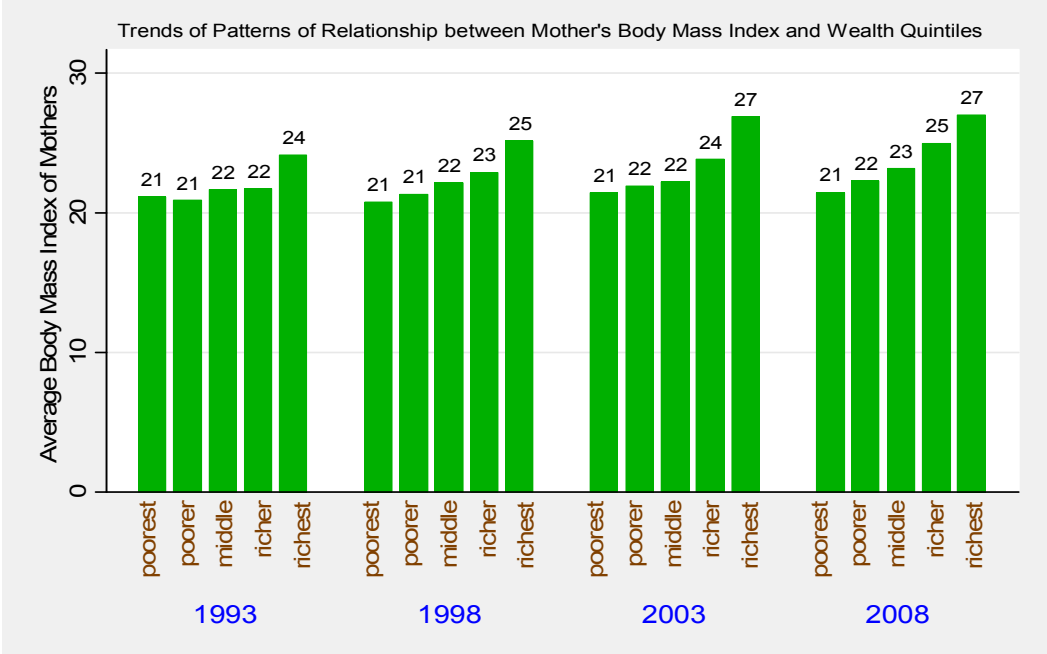


Figure 2 - Mother's Body Mass Index[1] and Wealth



Summary of Findings

We observe that wealth of household, mother's education and body mass index significantly reduce underweight. Community level interventions show a much stronger effect than national level policy interventions. The effect of regional disparity is significant as household wealth fails to explain weight-for-age in the case of intra-region analysis. Addressing implementation differences is important for a unified and an accelerated reduction of the proportion of underweight children.

[1] BMI or the Quetelet index, is used to measure thinness or obesity. BMI is defined as weight in kilograms divided by height squared in metres (kg/m2). A cut-off point of 18.5 is used to define thinness or acute undernutrition and a BMI of 25.0 or above usually indicates overweight or obesity.