LSMS-ISA
Integrated Surveys on Agriculture

Dynamics of wasting and underweight in Ethiopian children

Underweight prevalence among children 6-59 months in rural and small town areas of Ethiopia declined from 26.9 percent in 2012 to 24.9 percent in 2014, while wasting prevalence stalled at 11 percent. Using panel data from the Ethiopia Socioeconomic Survey (ESS), we perform cross-sectional and fixed effects analyses to uncover the factors that drive children in and out of each state and how they compare to static correlates at one point in time.

Background

Undernutrition in all forms is responsible for 51% of childhood deaths in Ethiopia. Wasting, defined by a weight-for height z-score below -2, is a measure of acute and severe malnutrition, while underweight, defined by a weight-for-age z-score below -2, is a broader measure of malnutrition in children 6-59 months. Both forms are associated with negative health, development, and long-term outcomes. While many studies have looked at correlates of stunting and underweight in Ethiopia using cross-sectional analysis, few have used panel data to identify drivers of changes, particularly with respect to wasting.

Data

We analyze data from two waves of the ESS, a collaborative project between the Central Statistics Agency of Ethiopia (CSA) and the World Bank's Living Standards Measurement Study- Integrated Surveys of Agriculture (LSMS-ISA) project that collects multi-topic panel data at the household level. The ESS began in 2011 as the Ethiopia Rural Socioeconomic Survey (ESS1), during which 3,969 rural and small town households were surveyed. In 2013, a second wave of the survey (ESS2) was administered, revisiting the ESS1 households and an additional 1,500 urban households; the panel sample includes rural and small town households only.

The ESS uses a stratified, two-stage sampling scheme. Regions of Ethiopia served as the strata and enumeration areas (EAs) were randomly selected in proportion to population size. A total of 290 and 43 EAs were selected from rural and small town areas, respectively, and twelve households were then chosen from each EA. Tracking between waves was done at the household level-- with a low attrition rate of 4.9%-- leading to a final panel sample of 3,776 households.

Methods

Our analysis was restricted to children who were 6-59 months during both waves of the ESS, with the main outcomes of interest as weight-for-height and weight-for-age z-scores, and binary indicators for whether the child is wasted or underweight. Independent variables are drawn from individual, household, and community level characteristics found to be associated with each outcome in the literature.

Cross-sectional analysis using Ordinary Least Squares (OLS) regression within each round of the data helps us understand the correlates of wasting and underweight within a static framework and compare our findings to existing literature. Next, we exploit the panel setup of the ESS to estimate fixed effect models for changes in each outcome, focusing on the sub-set of individuals that were 6-41 months at baseline and 24-59 months at follow-up (n=1,048). The fixed effects model improves upon the cross-sectional analysis by allowing us to control for all time invariant characteristics that influence our explanatory variables in addition to wasting and underweight. We also examine how dynamics in and out of each state vary in a further specification of the fixed effects model that controls for baseline wasting and underweight status.

Results

Table 1 displays the movement in and out of wasting between 2012 and 2014, with 13% of children experiencing an improvement and only 2% remaining

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perpetually wasted. Similarly, more children recovered from being underweight (16%) than became underweight (11%), but the fact that 128 children (12%) remained underweight from baseline to follow up emphasizes the need to better understand what drives *changes* out of undernourishment.

Table 1. Dynamics of Wasting

Always wasted	Became wasted	Became un-wasted	Never wasted	Total
1.92%	7.07%	13.02%	77.99%	100%
n=18	n=66	n=121	n=725	n=929

Our cross-sectional findings generally agree with the existing literature, particularly other studies using data from Ethiopia. Male children, those with illiterate mothers, male household heads, and older household heads, and those experiencing illness in the last two months were significantly more likely to have negative nutrition outcomes (lower z-scores or higher likelihood of wasting/underweight). Futhermore, having a solid roof, improved toilet, radio, cellphone, female cow, and laying hen were repeatedly significantly associated with positive outcomes. We also observe some departures from the existing literature that are worth noting; we find better weight-for-age z-scores and underweight outcomes for female children and those in female-headed households, unlike regional studies in Ethiopia.

After controlling for individual fixed effects, illness in the last two months remained significantly associated with changes in both z-scores and underweight status, increasing negative outcomes for each. Additionally, community level main road access, which was not significant in our cross-sectional models, was associated with positive changes in z-score. When also controlling for baseline status, we observed that factors driving changes to or from undernourished states vary, and children wasted at baseline were generally more responsive to household level changes than non-wasted children. For example, children wasted at baseline saw improvements in weight-for-height z-score when they gained a solid roof, improved toilet, or food assistance. Non-wasted children were not statistically significantly affected by such changes.

Discussion & Policy Implications

Overall, our results suggest childhood nutrition is improving in rural Ethiopia, though further research is warranted on a number of topics. Foremost, responses to illness in young children require investigation to determine what actions are taken at households and health centers, and how these responses relate to the negative nutritional outcomes we observed. Similarly, more research is needed on the differences between male and female-headed households with regard to children's nutrition, as outcomes were significantly improved in the latter. The combination of our findings and those obtained from the proposed research could then inform nutrition-related guidelines for health centers, community health workers, and households. Community-level main road access is also worth further investigation given our findings that it was associated with improved nutritional outcomes. It is likely that increased accessibility also improves economic outcomes in rural communities and would therefore further Ethiopia's progress on related national goals.

Finally, our findings support differential policy approaches for aiming to prevent vs. treat acute undernutrition. Children undernourished at baseline were more sensitive to household level changes such as asset ownership and food aid receipt than those who were adequately nourished. Therefore, while new efforts to improve living standards may simultaneously lift undernourished children to healthier states, emphasis should also be placed on preventing undernutrition altogether, thereby imbuing children with greater resiliency to external changes.

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The findings outlined in this brief are drawn from:
Cintron, C. (forthcoming) "Dynamics of wasting and underweight in Ethiopian children"

To access the ESS data:
hhtp://go.wordlbank.org/ZK2ZDZYDD0

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