



January 2013

Child Poverty Insights disseminates emerging research, practice and thinking on child poverty to a global audience of UNICEF and other UN staff, practitioners and academics.

This edition disseminates empirical findings on the link between catch-up in nutrition with household asset levels for poor malnourished children in rural Ethiopia.

Nutrition in Early Childhood: Insights from rural Ethiopia

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In your study *“Catching up from early nutritional deficits? Evidence from rural Ethiopia”* you find that wealthier children are more likely to catch up from stunting in childhood. Is this really a surprising finding?

Not in a global sense. The link between wealth and child nutrition is by now well established. Undernutrition in developed countries exists but is fairly un-common, however, in the developing world around a quarter of all children are underweight. In our study, my co-author Ingo Outes and I examine a group of poor Ethiopian children who live in rural areas (Outes and Porter, 2012). By “wealthy” we are speaking relatively. The wealthiest children in our study are still incredibly poor by global standards, living in households who have far less than a Dollar a day to spend. However, their outcomes at age 5 are significantly better than poorer children, even if they were underweight in the first year of their lives. We take from this that even small improvements in living standards can increase a child’s chances of catching up from stunting or malnutrition in the early years. In particular, investments in sanitation and water appear to have large payoffs.

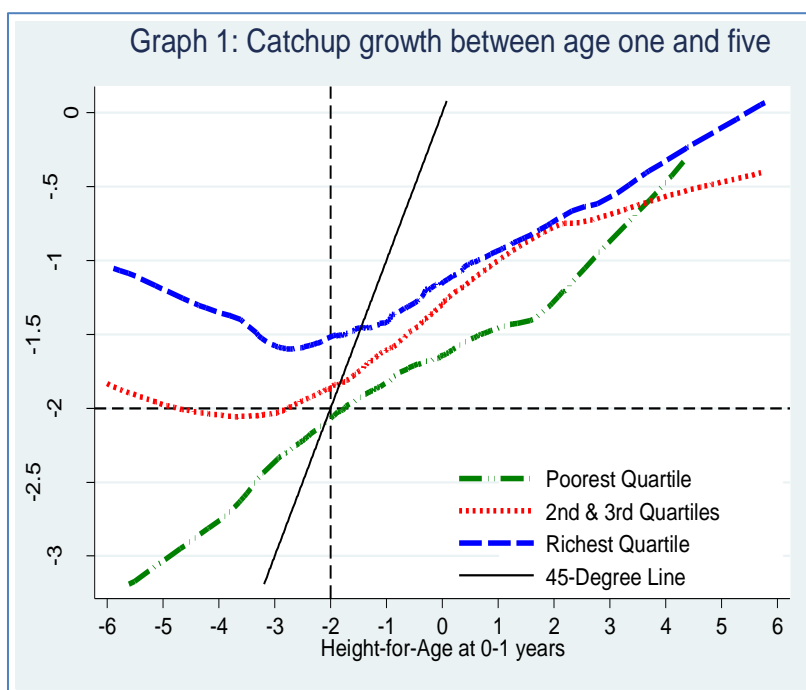
Our study is based on the Ethiopia Young Lives study of childhood poverty, which follows the same cohort of boys and girls born in 2001, from just after their birth. Ethiopia is one of the poorest countries in Africa and the national rate of undernutrition is 44 per cent (Ethiopia Demographic and Health Survey, 2011). In the Young Lives study 2000 children from around the country were first measured when they were aged six months to 18 months in 2002. They and their families were revisited again in 2006, when they were aged 4-5

years. The latest visit was in 2009 when they were aged 7-8 years, and they will be revisited this year and in 2015. Following the same children in this way allows us to examine the relative position of the children in their cohort and whether that position changes. Collecting information on the households also allows us to examine other correlates of undernutrition such as the wealth, location and composition of the household.

At what age are the children you studied affected by undernutrition?

For our study, we examined the nutritional status of the cohort and their patterns of catch-up growth between three key development stages: age one, five and eight. We used height for age z-scores (HAZ) to compare a child's height to that of a well-nourished international comparison group; these are designed by the World Health Organisation (2006, see reference below).

Of course for each individual, height depends on many things, not least their genetic potential. But over groups and populations we consider that relative height also reflects nutrition and health over life thus far, or a 'stock' of nutrition. We compare a child's height with the average height for their age and sex in the reference group. A HAZ of zero means that the child is exactly average. If it is below a -2, we consider the child to be experiencing stunted growth and -3 severely stunted. In our study cohort the mean HAZ at age 12 months is negative at -1.4, showing the poor nutrition of this group. The children on average become slightly more stunted by the age of five, though this is somewhat reversed by the age of eight.



We correlate the HAZ score for each child between periods – a higher correlation indicates more persistence in nutritional status. This is depicted in graph one for ages one and five. Nutritional status for each child is plotted for the two time periods. The 45-degree line shows perfect correlation between the two periods and the flatter the line, the *less* persistence there is – nutritional status at the early age is not a good predictor of the future. For this age group, we find that **nutritional catch-up patterns vary substantially across socioeconomic groups**: average catch-up growth in height-for-age is almost perfect among children in relatively better-off

households (blue line), who are much less likely to be stunted at the age of five. On the contrary, among the poorer children (green line), relative height is much more persistent, and they are more likely to remain stunted at five. These results are robust to the inclusion of other confounding factors in a regression analysis, for example controlling for mother's height.

In terms of wealth, we examined housing quality, consumer durables and access to services (water, sanitation, electricity and cooking fuel). Among these, access to services appears to be the most important. Having one of the four services reduces the probability of remaining stunted at 5 by 17% and having two or more services by 35%. We interpret these results as evidence that **services that improve the child's environment have complementary (and possibly separate) impacts on nutritional intake in terms of ability to catch up from nutritional shocks at an early age**, for example through reduced infections and illnesses.

Are there any differences by gender?

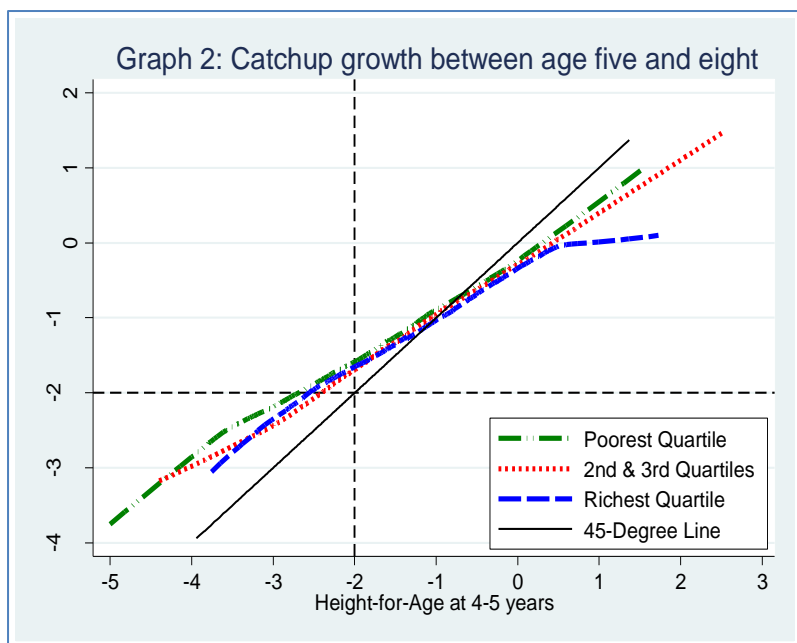
Actually, we don't find any significant differences between boys and girls in this case. This is similar to results in the larger Demographic and Health Survey of 2011, which actually shows that girls are slightly less likely to be stunted than boys. This seems to be a fairly common finding, at least for nutrition in Africa.

What could be the explanation? Do poorer households simply care less about child nutrition?

That seems highly unlikely. Our findings suggest that household wealth, and in particular access to services, can lead to substantial catch-up growth early on in life. Both richer and poorer households may wish to compensate for poor nutrition or illness in the early years, but richer households may be more successful as they have more resources available. We use a number of techniques to try and rule out unobserved heterogeneity, for example, by controlling for characteristics of parents. We also try to isolate variation in early period nutrition that is caused by factors outside the household (for example seasonal weather), using instrumental variables. This also helps to correct for measurement error in the data. The robustness checks confirm our graphical results.

Does catch-up growth continue past the age of five?

One worry is **that the opportunity for influencing nutritional achievement is short**. Between five and eight years of age, for the same group, we find near-perfect persistence in nutritional status. We also find no



evidence that wealth increases catch-up growth as shown in graph two. Here for all wealth quartiles, the correlation between HAZ in both periods is very close to perfect (almost parallel to the 45-degree line). The differences between graphs one and two are quite striking. This leads us to conclude, for our sample, that **the window of opportunity to catch up appears to close as early as the age of five**. This provides tentative evidence that nutritional status is harder to change in the later years, and is an area for further research with more frequent observation of children (the next round of Young Lives is scheduled for 2013).

What are the consequences of these findings?

In other work, I have examined the consequences of nutritional shocks on cognitive achievement (Outes, Porter and Sanchez, 2011). In a study of Peru we found that **height-for-age is a strong predictor of cognitive outcomes**, even when comparing between two children who live in the same household. Children who were relatively more impacted by the food price crisis of 2006-8 in Peru were shorter relative to their siblings. They also performed worse on a vocabulary test designed to measure cognitive achievement, and we show that this is due to the nutritional shock that they experienced.

There has been a considerable amount of recent work in economics that builds the case for childhood investments as not just a case of equity, but also of efficiency, led by Nobel prize winning economist Professor James Heckman and co-authors. The evidence is mounting **that falling behind during critical periods of childhood can lead to permanent effects on adult outcomes** such as educational achievement, health and earnings. Together with Stefan Dercon, I recently examined the long term consequences on child development of the 1984 famine in Ethiopia, one of the biggest famines ever to have hit Africa (Dercon and Porter, 2011).

Our findings show that **children who were aged below 36 months during the peak of the famine are up to 5cm shorter measured 20 years later**. That is both in comparison with their peers in less affected regions, and also to their older and younger siblings who did not suffer the crisis during this critical development period. We also find that they are more likely to report having experienced a recent illness.

The link between height and earnings has been established in both developed and developing countries. Nutritional investments may be even more important when much work in rural Africa (and other regions) for example involves hard agricultural labour. For the rural Ethiopian sample we calculate the relationship between height and income (mainly own-farm production), and find that taller household heads generate higher incomes. We calculate the economic costs of the famine therefore to be around 5-10% of earnings per year over the lifetime, which is a considerable amount.

Is investing in child nutrition a “big ask” in terms of resources?

Not really. We are talking about very small improvements – everyone in the Ethiopian studies mentioned are really very poor, so the comparison is really between poor households and even poorer households. The strongest result we have is on water and sanitation, which clearly improve nutrition for younger children in particular. There are a lot of national initiatives already underway that also improve children’s health and nutritional status – we couldn’t investigate those as they affected all children in our sample, so we had no comparison group. However, our findings show that **small changes to economic wellbeing of households could make a big impact on both current nutrition and future outcomes, and underscore the importance of investment in under-5’s**.

References/Further Reading:

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