A conversation with Professor Jere Behrman, August 10, 2017

Participants

- Professor Jere Behrman – Professor of Economics and Sociology, and Associate Director, Population Aging Research Center, University of Pennsylvania
- Stephan Guyenet – Research Consultant, GiveWell
- Josh Rosenberg – Senior Research Analyst, GiveWell

Note: These notes were compiled by GiveWell and give an overview of the major points made by Professor Jere Behrman.

Summary

GiveWell spoke with Professor Behrman of the University of Pennsylvania as part of its investigation into the potential long-term effects of early-life nutrition-related interventions. Conversation topics included a longitudinal study of nutrition interventions in Guatemala, Professor Behrman and Professor Mark Rosenzweig's 2004 twin study "Returns to Birthweight," and the external validity of these studies.

"Returns to Birthweight"

Relevance of findings to developing contexts

Professor Behrman published a paper in 2004 with his coauthor Professor Mark Rosenzweig called "Returns to Birthweight" (http://www.mitpressjournals.org/doi/abs/10.1162/003465304323031139?journalCode=rest). It is uncertain whether these results can be generalized to developing contexts, since the subjects in "Returns to Birthweight" were monozygotic female twins born in Minnesota.

It seems likely that context is very important, such that two babies with the same low birthweight will have different outcomes if one is raised in Minneapolis and the other in rural Guatemala. This is because even if both children receive parental and institutional support for their deficiencies, the child in Minneapolis will have access to much better resources than the child in Guatemala, potentially leading to better long-term outcomes.

Also, it is possible that the effects of birthweight on adult outcomes are nonlinear, such that the difference in birthweight between twins with a very low birthweight (~2500g) has a larger impact on the difference in their long-term outcomes than the same absolute difference would have for twins with a normal birthweight.

However, Professor Behrman still feels that his results have some relevance to lower-income situations, where infant growth restrictions are caused by infectious disease or undernutrition, and can to some extent be used to make judgments about the impacts of nutrition interventions in those settings.

Male data

The data that Behrman and Rosenzweig's paper used were collected in 1994, in a socioeconomic survey sent out by mail. The initial data included responses from both males and females, but the paper only presents an analysis of the female data. This is primarily because females responded at a higher rate than males, and the male cohort size was too small to allow Professors Behrman and Rosenzweig to effectively answer the questions they were interested in. Unpublished analysis of the male data showed results parallel to those found in women, but with less precision.

The data used in "Returns to Birthweight" still exist, so it is possible to view the data for the male population. However, a procedure is required to obtain the data; they are not publicly available due to confidentiality considerations.

Longitudinal study in Guatemala

Professor Behrman believes that some of the strongest data on the long-term effects of birthweight in a developing context come from a longitudinal study conducted by the Institute of Nutrition of Central America and Panama (INCAP). The INCAP Longitudinal Study (ILS) was conducted in four villages in rural Guatemala. Researchers collected data for many variables, including birthweights, from 1969 to 1977. Follow-up studies were conducted between 1988 and 2017.

A limitation of the ILS is that it only has four units of randomization: randomization across the four participating villages. However, if the first thousand days of life are a particularly important period, as many nutritionists maintain, then arguably the ILS has randomization across birth cohorts as well as across the four villages. This makes the ILS more powerful than it would be if it were only randomized across four units.

Though the data from the ILS are imperfect in this way, they are important because they are the only data available that show the long-term effects of birthweight on adult outcomes in malnourished contexts. Other trials have been initiated recently, but it will be a long time before those trials are able to provide data on adult outcomes.

Potential future work

Professor Behrman is interested in doing more monozygotic twin studies in the future, possibly using the Washington State University twin registry, which has information on many different metrics for adult twins. He currently does not have future studies planned that will address the impact of birthweight on adult economic outcomes.

Other people doing similar work

GiveWell is interested in systematically reviewing the available literature on early-life growth and nutrition and figuring out how to apply the results in developing

contexts. Professor Behrman is aware of two literature reviews done on similar topics, but none that comprehensively survey the natural experiments relevant to these questions and critically review the quality of the evidence in those experiments. The two other literature reviews are:

- **Victora (2008)** reviewed observational evidence on the impact of maternal and child undernutrition on adult health, education, and economic outcomes in developing countries.
- **Ruel and Alderman (2013)** reviewed evidence on the nutritional effects of programs in several sectors, including schooling and early child development.

All GiveWell conversations are available at http://www.givewell.org/conversations